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Fairness and Equity in Climate Change

Friedrich Soltau

S.J.D. Thesis

Pace University Law School

April 2008

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This thesis is dedicated to my son Nikhil, whose laughter and joy brightens our every day.

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<p>The views expressed in this document are the author's and do not represent the views of the United Nations.</p>
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List of Abbreviations and Acronyms

AAUs	Assigned Amount Units
AF	Adaptation Fund
AGBM	<i>Ad hoc</i> Group on the Berlin Mandate
AIJ	Activities Implemented Jointly
APEC	Asia Pacific Cooperation
AWG	<i>Ad Hoc</i> Working Group on Annex 1 commitments. Launched by the Conference of the Parties at its Eleventh Session (COP-11) in 2005 to negotiate the Protocol's second, post-2012 commitment period.
Annex I	Annex I Parties to the UNFCCC. Industrialized countries and countries with economies in transition.
Annex II	Annex II Parties to the UNFCCC. This group consists of the OECD industrialized countries.
Annex B	This Annex to the Protocol lists the Parties that have assumed binding emission limitation and reduction commitments and sets out their actual commitments
AOSIS	Alliance of Small Island States
APP	Asia-Pacific Partnership on Clean Development and Climate
CBDR	Common but differentiated responsibility
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CERs	Certified Emission Reduction Units
CFCs	Chlorofluorocarbons
CH ₄	Methane. One molecule of methane as a warming potential of approximately 20 times that of CO ₂ .
CO ₂	Carbon dioxide
CO ₂ equivalent	The amount of CO ₂ that would cause the same amount of radiative forcing as the mixture of CO ₂ and the other gases.
Commitment period	The emission limitation and reduction commitments under the Kyoto Protocol cover a five-year period from 2008-2012.
COP	Conference of the Parties
COP/MOP	Conference of the Parties serving as the Meeting of the Parties. Supreme body of the Kyoto Protocol.
CSD	UN Commission on Sustainable Development
EB	CDM Executive Board
EC	European Community
EITs	Economies in transition. The industrialized countries contained in Annex I or B that are undergoing the transition to a market economy.
ERTs	Expert Review Teams
ERUs	Emission Reduction Units
EU ETS	European Union Emission Trading Scheme
FCCC	Framework Convention on Climate Change
G-8	Group of eight industrialized countries: Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States.
G-77	Group of 132 developing countries
G-77/China	G-77 and China
GA	General Assembly

GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse gas
GNP	Gross National Product
GWP	Global warming potential
HFCs	Hydrofluorocarbons
ICAO	International Civil Aviation Organization
ICJ	International Court of Justice
ICSU	International Council of Scientific Unions
IEA	International Energy Agency
ILA	International Law Association
ILC	International Law Commission
ILM	International Legal Materials
IMO	International Maritime Organization
INC	Intergovernmental Negotiating Committee
IPCC	Intergovernmental Panel on Climate Change
ITLOS	International Tribunal for the Law of the Sea
JI	Joint Implementation
JPOI	Johannesburg Plan of Implementation
JUSCANZ	Japan, United States, Canada, Australia, New Zealand
LDCs	Least Developed Countries
LDCF	Least Developed Countries Fund
LRTAP	Convention on Long Range Transboundary Air Pollution
LULUCF	Land use, land use change and forestry
MDGs	Millennium Development Goals
MEAs	Multilateral environmental agreements
MEM	Major Economies Meeting on Energy Security and Climate Change
NGO	Non-governmental organization
NIEO	New International Economic Order
N ₂ O	Nitrous oxide
Non-Annex I	Parties that do not belong to Annex I of the UNFCCC, i.e. largely but not exclusively developing countries.
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
OPEC	Organization of Petroleum Exporting Countries
PAMs	Policies and Measures
PFCs	Perfluorocarbons
ppm	Parts per million
PPP	Purchasing power parity
QELROs	Quantified emission limitation and reduction objectives
REDD	Reducing emissions from deforestation and degradation
RMU	Removal Units
SAR	Second Assessment Report of the IPCC
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SCCF	Special Climate Change Fund

SD	Sustainable Development
SF ₆	Sulfur hexafluoride
SIDS	Small island developing states
SPM	Summary for Policymakers
TEAP	Technical and Economic Assessment Panel
UN	United Nations
UNCED	UN Conference on Environment and Development
UNCLOS	UN Convention on the Law of the Sea
UNCTAD	UN Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNTS	UN Treaty Series
WCRP	World Climate Research Programme
WG	Working Group
WMO	World Meteorological Organization
WRI	World Resources Institute
WTO	World Trade Organization

Chapter 1 - Introduction

1.1 Equity and fairness in climate change

Questions of fairness and equity are central to the challenge of tackling global climate change. The complexity of the question arises from the global and long-term nature of the problem. At the same time, the impacts are localized and differentiated, so that states least able to respond are those that will be hardest hit. Policies and measures to abate – mitigate – greenhouse gas (GHG) emissions demand the decision-making under conditions of uncertainty and the commitment of resources beyond the time horizon of politics-as-usual. And while international environmental law has achieved notable successes, it has arguably not confronted a challenge with so many dimensions, including lifestyles, energy policies, and inequality in global community. Some analysts have argued that questions of fairness and equity are of secondary, largely rhetorical significance: willingness to pay is what matters.¹ Such views grow from a realist perspective on the relations between states and skepticism about international law. The argument presented in this thesis is that a fair distribution of benefits and burdens is at the heart of the matter. Individual and collective responses to the climate change problem are shaped and determined by social and political factors, as much as by technical and as scientific ones. Normative analysis has a role to play in analyzing the problem of climate change and identifying solutions.

Within two decades emissions from developing countries of carbon dioxide, the most important greenhouse gas, will exceed the share from industrialized countries. The United States and countries argue that reduction measures therefore are only meaningful if developing countries are prepared to trim their emissions. In turn, developing countries look forward, contending that they ought not bear the burden of abatement at this critical stage in their development. They point also to the historical responsibility of the developed countries, invoking the polluter pays principle. Small islands and other particularly vulnerable developing countries seek to emphasize global solidarity and fairness when pressing claims for assistance to adapt to the adverse impacts of climate change. These are only some of the issues entwined in the debate on climate change, and which lead directly or indirectly to the question of fairness.

Climate change stems from the activities at the very heart of our economies and way of life. Of world energy, around 85 per cent is supplied from fossil fuels – coal, gas, and oil.² Altogether, carbon dioxide from the combustion of fossil fuels is responsible for well over half of all GHG emissions, approximately another quarter comes from carbon dioxide released in the process of deforestation, and various gases released from agricultural and other activities.³ Many of environmental problems stem from human activity, but none relate so directly to the driving force of modern economies. Stabilizing emissions at the level that would prevent large-scale, irreversible damage to the biosphere will require not merely an incremental

¹ See DAVID VICTOR, *THE COLLAPSE OF THE KYOTO PROTOCOL AND THE STRUGGLE TO SLOW GLOBAL WARMING* (2001).

² INTERNATIONAL ENERGY AGENCY, *WORLD ENERGY OUTLOOK* (2006).

³ WORLD RESOURCES INSTITUTE, *NAVIGATING THE NUMBERS 5-7* (2006).

adjustment of our energy system, but over time a full-scale transition to new modes of low-carbon consumption and production.

The United Nations Framework Convention on Climate Change (UNFCCC), which was adopted in 1992 and came into force three years later, is the foundation of the global response to climate change.⁴ The ultimate objective of the Convention is the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human interference with the climate system. It does not contain binding emission targets. For this reason countries initiated a negotiating process that culminated in the adoption of the Kyoto Protocol in 1997.⁵ The Protocol, which entered into force in February 2005, commits industrialized countries – so-called Annex 1 parties to the UNFCCC – to reduce their GHG emissions by an average of 5.2 per cent from 1990 levels during the first commitment period from 2008 to 2012. However, this binding target applies only to some 36 countries, representing about 30 per cent of global GHG emissions. The non-participation of the United States, coupled with various compromises made in the process of bringing the Protocol into operation, means that the real reduction will be well below 5.2 per cent. The Protocol is thus only a modest first step in the direction of stabilizing global emissions.

Studies suggest that depending on the stringency of chosen target, global GHG reductions of 25-70 percent below 2005 levels may be necessary by 2050, while by the end of the 21st century emissions must be 80 per cent below current levels.⁶ Should the international community commit to holding the temperature increase below 2 degrees Celsius (3 degrees Fahrenheit), a target proposed by the European Union, global emissions would have to peak in 2015 at the latest and decline rapidly for the rest of the century (see table below).

Characteristics of post-TAR stabilization scenarios

CO ₂ concentration - Parts per million (ppm)	CO ₂ -eq concentration (ppm)	Global mean temperature increase above pre-industrial (Celsius)	Year in which CO ₂ emissions peak (year)	Change in CO ₂ emissions in 2050 (% of 2000 emissions) (%)
350-400	445-490	2.0-2.4	2000-2015	-85 to -50
400-440	490-535	2.4-2.8	2000-2020	-60 to -30
440-485	535-590	2.8-3.2	2010-2030	-30 to +5
485-570	590-710	3.2-4.0	2020-2060	+10 to +60

Source: Adapted from IPCC, 2007, WGIII, table SPM. 5

⁴ United Nations Framework Convention on Climate Change, *adopted on May 9, 1992*, art. 3(1), 1771 U.N.T.S 164 Article 3(1) [hereinafter UNFCCC].

⁵ Kyoto Protocol to the United Nation Framework Convention on Climate Change, December 11, 1997, 37 I.L.M. 22, text available on the website of the UNFCCC secretariat, <http://unfccc.int/resource/docs/convkp/kpeng.pdf>.

⁶ NICHOLAS STERN, THE ECONOMICS OF CLIMATE CHANGE, THE STERN REVIEW, CABINET OFFICE, HM TREASURY 193 (2006), http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

1.1.1 Changing nature

In the developed world technology has permitted humans to remove themselves from the forces of nature, so that the shelter, food, work, and recreation can be provided, save in rare circumstances, independent of the climate. Today the climate penetrates the public consciousness predominantly through natural disasters, like Hurricane Katrina and droughts and phenomena such as the El Niño effect. Despite its inherently unpredictable and dynamic character, society clings to the belief that like nature in general, climate can be conquered and controlled through technology. Even as the threat of climate change is understood, the reflex on the part of many policy-makers and some scientists is to set store first by further research, and second by technology. Both are essential parts of the solution, yet they may also serve to avoid a more searching approach to the problem.

According to the Intergovernmental Panel on Climate Change (IPCC) surface temperatures have increased by 0.7 degrees Celsius over the past century, with current concentrations making some further warming inevitable.⁷ Depending on their degree of vulnerability, countries will have to adapt more or less to the impacts of climate change. Adaptation will be particularly challenging for those societies that are already have difficulty providing for their people. Further, the record of human adaptation – in pre-historical and modern eras – to climate change has not been simple or easy.⁸ Adaptation requires changes in technology, as well as social and cultural ways of life. Not for nothing is there frequent mention in myths and histories of calamitous climatic events.

Even as climate change serves to make society aware of its renewed vulnerability to extremes of climate - rattling the notion that nature has been tamed - it challenges the very conception of nature. For even as society has built up defenses, channeling and domesticating nature, we have retained a belief in the “wildness” of nature, with wilderness an iconic value, as evidenced, in banal form, in popular media advertising. As William McKibben notes, our faith in the essential strength of nature endures so long as we consider damage as local. However, shifting from the local to the global destroys that faith.⁹

“The idea of nature will not survive the new global pollution – the carbon dioxide and the chlorofluorocarbons and the like. This new rupture with nature is different not only in scope but also in kind from the salmon tins in an English stream. We have changed the atmosphere, and thus we are changing the weather. By changing the weather, we make every spot on earth man-made and artificial. We have deprived nature of its independence, and it is fatal to its meaning. Nature’s independence is it’s meaning; without it there is nothing but us.”

⁷ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS. CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 5 (Susan Solomon et al, eds., 2007).

⁸ Donald Worster, *Climate Change and History: Lessons from the Great Plains*, in EARTH, AIR, FIRE, WATER 65, 72 (John K. Conway et al eds., 1999). Worster refers to the efforts to make the Plains viable for agriculture concludes, among other things, that adapting to a volatile environment with technology is more unreliable strategy than is thought, often bringing with it unforeseen consequences. He also underlines how we underestimate the challenge of cultural adaptation to environment.

⁹ WILLIAM MCKIBBEN, THE END OF NATURE 58 (1989).

While this view is quite stark, it usefully underlines two important points. First, that global climate change, once-and-for-all, dispenses with the illusion that human impact on the climate is confined to the local and can be treated as such. Second, and following from the first, our relationship to, and conception of nature, must be re-evaluated. The notion that humanity's knowledge and technological prowess also implies mastery over the physical world is bumping up against its limits. A related issue concerns fundamental assumptions concerning economic growth and whether there may be limits to growth.¹⁰ Certainly any climate policy predicated on, or implying, any significant limits on growth would be political non-starter in developing countries, but also in the industrialized world. Nonetheless, it is not certain that a stringent global climate change target is in practice compatible with economic growth of the kind the world has become accustomed to.

The ideas sketched here are a reminder that global climate change presents a fundamental challenge to our social, cultural and political systems. It is worth bearing in mind that climatic change reaches far back to the origins of humankind, playing a role in the evolution of the human species.¹¹ Climate change poses a challenge for scientists, philosophers, economists, and, most crucially, politicians and policymakers. Climate change is a classical over-the-horizon problem – bold policy steps need to be taken today, with largely no return in the near term, even while scientists are still engaged in putting the precise outlines to the threat. As demonstrated by the halting effort to address it international legal instruments, climate change poses enormous challenges for the international environmental governance. From this perspective, the response to date can be regarded as failure to fully acknowledge the scale of the problem. The question could justifiably be asked whether decision-makers and citizens have faced up to the kinds of decisions that will need to be made.

One question that emerges is whether climate change poses a problem of a fundamentally different nature, or whether it distinguishes itself only scope from other global environmental issues such as biodiversity loss, or even larger development issues such as poverty and inequality. On the one hand it may be the sheer global scale of climate change, the size of the natural system - our biosphere - whose functioning is being affected. More important may be that while there are large number of environmental and development challenges (health, water, sanitation) vying for attention, climate change is linked in multiple ways with almost all of them. It has recently been found that climate change will be one of main causes of biodiversity loss, threatening ecosystems such as coral reefs, and subjecting fragile ecosystems to change on time scales that in many cases do not permit adaptation. Changes in temperature and precipitation patterns threaten agriculture, settlements

¹⁰ DONELLA H. MEADOWS ET AL., *THE LIMITS TO GROWTH* (1972). The specific projections of resources shortages projected in the book proved wrong, and the analysis adopted in the book was heavily criticized.

¹¹ A compelling hypothesis explains the sudden extinction of species and the appearance of new ones, to which the fossil record testifies, with reference to environmental change, specifically climatic change. See WILLIAM K. STEVENS *THE CHANGE IN THE WEATHER: PEOPLE, WEATHER, AND THE SCIENCE OF CLIMATE* 19 (2001), referring to the work of Elisabeth Vrba, *On the Connections between Paleoclimate and Evolution*, in *PALEOCLIMATE AND EVOLUTION, WITH EMPHASIS ON HUMAN ORIGINS* 24-25 (Vrba et al., eds., 1996).

and development efforts. In many cases the most severe impacts will occur where people are poor, directly dependent on natural systems for survival and without the capacity or resources to adapt. Climate change is thus relevant to development and poverty alleviation and is likely to worsen existing distributional inequalities.¹²

1.1.2 The importance of economics

Addressing climate change is in effect also a discussion concerning the structure of our economies and the energy systems that drive them. Almost invariably any debate on responses to climate change will be refer to costs – either of mitigation measures, or of the likely losses stemming from climate impacts. And this is not surprising, because the economic implications of climate change are significant, with considerable uncertainty. Traditional economic analysis tends to put a lower value on committing resources to guard against damage in the future, such as climate change, as opposed to other concerns such as fighting disease and providing access to clean water and sanitation.¹³ A recent study commissioned by the United Kingdom comprehensively analyzed the cost of climate change, coming to the conclusion that the early action would be considerably less costly than further delay.¹⁴

Economic analysis provides very useful tools to evaluate the costs and benefits of various courses of action. Nonetheless, the very dictates of such analysis – focused on what is the most efficient allocation of resources in the present – may mean it is less useful in informing decisions which have profound, irreversible impacts on systems whose value cannot be analyzed adequately in monetary terms. For instance, how is it possible to compare a percentage loss of Gross Domestic Product (GDP) with the potential destruction of ecosystems such as the Great Barrier Reef? The framework of the analysis, while potentially maximizing human welfare in the present, does not account adequately for irreversible impacts on the biosphere.

This thesis advances the argument that a proper consideration of norms and values should guide the collective response to climate change, including the manner in which economic analysis is used to aid the decision-making process. In this respect, equity and fairness are guiding norms.

Energy and its various dimensions– sources, growth rates, technology - are at the heart of the climate change problem. Accordingly the next section provides an overview of the energy challenge. The intention is to capture a few key aspects without doing a disservice to this complex topic.

¹² See UNDP, HUMAN DEVELOPMENT REPORT 2007/2008, FIGHTING CLIMATE CHANGE: HUMAN SOLIDARITY IN A DIVIDED WORLD (2007).

¹³ See for instance the “Copenhagen Consensus”, which featured a panel of prominent economists, including three Nobel Prize winners, who were asked to rank the spending priority of a number of development challenges given an extra \$50 million in aid resources. Controlling HIV/Aids ranked at the top, while measures to combat climate change were ranked at the bottom. See *Putting the World to Rights*, THE ECONOMIST, June 3, 2004. The basic reason for coming to this conclusion is that under a cost-benefit analysis the economic benefits of reducing global warming are largely not felt until well into the 21st century—and the costs are felt immediately. See also GLOBAL CRISES, GLOBAL SOLUTIONS (Bjørn Lomborg, ed., 2004).

¹⁴ STERN, *supra* note 6.

1.1.3 The energy challenge

Even as the steady rise in greenhouse gas emissions is beginning to make its effects felt, access to safe energy and effective energy remains largely out of reach in many developing countries. It is estimated that some 2 billion people—one-third of the world's population—rely almost completely on traditional energy sources, and are unable to take advantage of modern forms of energy, such as electricity, that are taken for granted in the developed world.¹⁵ For instance, combined rural and urban electrification rate for sub-Saharan Africa is 26 per cent, while the figure for rural areas is only 8 per cent.¹⁶ The developing countries' share of primary energy demand is forecast to grow from 40 per cent in 2004 to 50 per cent in 2030.¹⁷ Global energy demand is projected to double over this period, with over 70 per cent of the increase coming from developing countries.¹⁸

Access to modern energy is increasingly widely recognized crucial to stepping out of poverty and for meeting the Millennium Development Goals (MDGs).¹⁹ The Millennium Development Goals (MDGs) are the international community's commitment to halving poverty in the world's poorest countries by 2015. The role of energy in sustainable development and poverty reduction has been recognised in a number of United Nations declarations and other soft-law instruments. For example, the Johannesburg Plan of Implementation, adopted at the World Summit on Sustainable Development in 2002, refers extensively to energy in the context of sustainable development and highlights the need to enhance access to energy, including from renewable sources.²⁰ Similarly, the eighth Conference of the Parties to the United Nations Convention on Climate Change (UNFCCC) in New Delhi in 2002, affirmed that "economic and social development and poverty eradication are the first and overriding priorities of developing country Parties" and that energy policies should be supportive of developing countries' efforts to eradicate poverty.²¹ The resolution adopted at the 2005 World Summit of Heads of State and Government addressed the question of climate change and underlines that the international community faced "serious and multiple challenges in tackling climate change, promoting clean energy, meeting energy needs and achieving sustainable development".²²

Providing access to a basic minimum of energy services for household cooking, heating and lighting for the poor in Africa and South Asia would have only a modest impact on emissions.²³ However, the path to full-scale industrialization, as is taking place in the emerging economies of Asia, is on a different scale. Overall,

¹⁵ U.N. DEVELOPMENT PROGRAMME ET AL, WORLD ENERGY ASSESSMENT 3 (2000).

¹⁶ INTERNATIONAL ENERGY AGENCY, *supra* note 2, at 567.

¹⁷ *Id.* at 68.

¹⁸ *Id.* at 68.

¹⁹ U.N. DEVELOPMENT PROGRAMME & THE WORLD BANK, ENERGY SERVICE FOR THE MILLENNIUM DEVELOPMENT GOALS 1 (2005).

²⁰ *Report of the World Summit on Sustainable Development*, Resolution 2, Annex, Plan of Implementation of the World Summit on Sustainable Development, paras. 19-20, U.N. Doc. A/CONF.199/20.

²¹ Decision 1/CP.8, *Report of the Conference of the Parties on its Eighth Session*, Addendum, Part II: Action taken by the parties, vol. 1, FCCC/CP/2002/7/Add.1.

²² G.A. Res. 60/1, para. 50, U.N. Doc. A/RES/60/1.

²³ VIJAY MODI ET AL, ENERGY AND THE MILLENNIUM DEVELOPMENT GOALS 30-31 (2006).

energy consumption in developing countries remains low in both absolute terms and per capita terms. Per capita energy consumption in developing countries is about one-sixth that in Europe and one-eighth that in North America.²⁴

Commercial primary energy use by region

Region	Million tonnes of oil equivalent (Mtoe)		2006 as share of world total (percentage)	Percentage growth 2000-2006
	2000	2006		
North America	2,737.5	2,803.0	25.8	2.4
South & Central America	456.2	528.6	4.9	15.8
Middle East	402.9	554.2	5.1	37.5
Africa	275.8	324.1	4.0	17.5
Europe and Eurasia	2829.2	3,027.2	27.8	6.9
Asia Pacific	2607.0	3641.5	33.5	28.4
World Total	9308.7	10878.5	100	16.8
EU 27	1709.7	1781.9	16.4	4.2
OECD	5359.6	5553.7	51.1	3.6
Former Soviet Union	941.3	1046.1	9.6	11.1
United States	2311.9	2326.4	21.4	0.6
Japan	514.8	520.3	4.8	1.0
Germany	330.5	328.5	3.0	-0.6
China	966.7	1697.8	15.6	43.0
India	320.4	423.2	3.9	32.0

Source: Adapted from BP, Statistical Review of World Energy (2007)

The above table bears out that energy consumption has grown in all regions, developed and developing alike, albeit much more slowly in the former. In fact, the only instance in which energy demand has fallen is in the case of economic downturns, as in the case of the states of the former Soviet Union after the end of Communism. Yet as noted earlier, global energy demand is set to increase by half by 2030 then go on to double by 2050. Over the same period, a continuation of current trends would see emissions more than doubling from current levels.²⁵ To stabilize GHG concentrations at roughly double pre-industrial levels, which would limit warming to about 2 degrees Celsius, would require that global emissions fall to about 50 per cent *below* 1990 levels in 2050.²⁶ This will be a challenging task. A recent report by the International Energy Agency concluded that the accelerated deployment of

²⁴ WRI, EARTHTRENDS ENVIRONMENTAL INFORMATION, <http://earthtrends.wri.org/text/energy-resources/variable-351.html> (online searchable database, last accessed 8 August 2007).

²⁵ PRICEWATERHOUSECOOPERS, THE WORLD IN 2050: THE IMPLICATIONS OF GLOBAL GROWTH FOR CARBON EMISSIONS AND CLIMATE CHANGE POLICY 3 (2006), <http://www.pwc.com/extweb/pwcpublications.nsf/docid/dfb54c8aad6742db852571f5006dd53>; INTERNATIONAL ENERGY AGENCY, ENERGY TECHNOLOGY PERSPECTIVES – SCENARIOS AND STRATEGIES TO 2050 25 (2006); STERN, *supra* note 6, at 176-177.

²⁶ Michel den Elzen & Malte Meinshausen, *Multi-gas Emission Pathways for Meeting the EU 2 degree Celsius Climate Target*, in AVOIDING DANGEROUS CLIMATE CHANGE 299 (Hans Joachim Schellnhuber et al, eds., 2006)

energy technologies could return energy-related carbon dioxide emissions to their current levels by 2050.²⁷

Stabilizing concentrations at around double pre-industrial levels would entail a massive increase in the supply of carbon-free energy, in the order of the entire current global energy demand.²⁸ A strategy to mitigate emissions must begin by improving the efficiency with which energy is produced – for instance, installing more efficient power plants – and consumed by end users, for instance through more efficient household appliances or compact fluorescent light bulbs (CFLs). Improvements in efficiency, along with changes in the source of energy, are the main reason that carbon dioxide emissions have risen only half as fast as world economic output (1.5 versus 3 percent per year).²⁹

Second, and crucial in the long term, it will be necessary increase energy from carbon-free energy sources such as renewables. Renewable energy has important co-benefits in that it when substituted for fossil energy it reduces air pollution and contributes to energy security, particularly for countries that face high fuel import costs such as small island states. However, as the table below illustrates indicates the actual contribution of renewables – especially wind, solar and geothermal – is very low, meaning that even with dramatic increases in capacity, the share overall share is projected to remain fairly modest. Studies of the combined technical potential of bio-energy, wind, geothermal and hydro suggest that these sources will not be able to meet the demand for carbon-free energy.³⁰ Theoretically solar energy, which has the greatest technical potential of all renewable energies, could meet global energy demand, but it faces technical and cost barriers. Moreover, the existing share in 2004 of only 0.039 per cent of global energy supply underlines the limits faced in scaling up solar energy.³¹ Moreover, with some exceptions, in the absence of subsidies, renewable energy is currently not competitive with other energy sources.³² Naturally, when carbon is priced – either through a cap-and-trade scheme or a carbon tax – renewable energy will become more competitive. Economies of scale and technical innovation will over time bring down the cost of renewables. Biofuels as a substitute for fossil fuels in road transportation have been the subject of increased attention, driven energy security and climate concerns. According to one estimate biofuels could meet 4-7 per cent of road-transport fuel demand,³³ but net greenhouse gas reductions from displacing fossil fuels depends on the feedstock, with corn ethanol, for instance, delivering significantly lower climate benefits than ethanol produced

²⁷ INTERNATIONAL ENERGY AGENCY, *ENERGY TECHNOLOGY PERSPECTIVES*, *supra* note 25, at 25.

²⁸ Martin I. Hoffert et al, *Energy implications of future stabilization of atmospheric CO₂ content*, 395 (6704) NATURE, 881 (1998).

²⁹ Roberta Hotinski et al, *Solving the Climate Problem*, 46 (10) ENVIRONMENT 10 (2004).

³⁰ See VACLAV SMIL *ENERGY AT THE CROSSROADS: GLOBAL PERSPECTIVES AND UNCERTAINTIES* (2003). RICHARD DOORNBOSCH & SIMON UPTON, INTERNATIONAL ENERGY AGENCY, *DO WE HAVE THE RIGHT R&D PRIORITIES TO SUPPORT THE ENERGY TECHNOLOGIES OF THE FUTURE?* SG/SD/RT(2006)1 25 (2006).

³¹ INTERNATIONAL ENERGY AGENCY, *RENEWABLES IN GLOBAL ENERGY SUPPLY: AN IEA FACT SHEET 3* (2007).

³² The implicit subsidies made available for fossil fuels must be borne in mind.

³³ INTERNATIONAL ENERGY AGENCY, *supra* note 2, at 385.

from sugar cane.³⁴ Unintended consequences of increased cultivation of crops for biofuels production may include rising food prices, impacts on land and water supplies, and increased release of carbon dioxide from land cleared for cultivation.³⁵

Many analyses acknowledge that meeting the need for clean energy will depend on utilizing a number of options, which would include nuclear and carbon capture and storage.³⁶ Carbon capture and storage is increasingly seen as a vital part of a clean energy future, and major research and development efforts are underway in the United States and other industrialized countries.³⁷ This technology involves the separation, compression and long-term storage of carbon dioxide associated with from fossil fuel combustion at power plants.³⁸ This technology, while featuring in all modeling of mitigation scenarios, has not yet been demonstrated on a commercial scale in a power plant.

World Primary Energy Demand – percentage share

	1980	2004%	2030	2004-2030 annual growth
Coal	24.6%	24.7%	26.0%	1.8%
Oil	42.8%	35.2%	32.5%	1.3%
Gas	17.0%	20.4%	22.5%	2.0%
Nuclear	2.6%	6.4%	5.0%	0.7%
Hydro	2.0%	2.1%	2.39%	2.0%
*Biomass and waste	10.4%	10.5%	9.2%	1.3%
**Other renewables	0.44%	0.50%	1.7%	6.6%

Source: Adapted from IEA World Energy Outlook (2006)

*Includes biomass used for heating and cooking, especially in developing countries

**So-called “new renewables” like wind, solar, geothermal

³⁴ INTERNATIONAL ENERGY AGENCY, BIOFUELS FOR TRANSPORT: AN INTERNATIONAL PERSPECTIVE 13 (2004).

³⁵ UN-ENERGY, SUSTAINABLE BIOENERGY: A FRAMEWORK FOR DECISION-MAKERS (2007), <http://esa.un.org/un-energy/pdf/susdev.Biofuels.FAO.pdf>. The clearing of land for palm oil production in the process releasing large amounts of carbon dioxide stored in peatlands, is turning out to be one of the unintended consequences of rising demand for biofuels. See e.g. Elisabeth Rosenthal, *Once a Dream Fuel, Palm Oil May Be an Eco-nightmare*, NY TIMES, January 31, 2007.

³⁶ Steven Pacala & Robert Socolow, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies*, 305 (5686) SCIENCE (2004); IPCC, CLIMATE CHANGE 2007: MITIGATION, CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Bert Metz et al eds., 2007). Some prominent environmental thinkers, e.g. John Lovelock now advocate nuclear energy as a crucial to combating climate change. See JOHN LOVELOCK, *THE REVENGE OF GAIA* (2007).

³⁷ See e.g. NATIONAL ENERGY TECHNOLOGY LABORATORY, U.S DEPARTMENT OF ENERGY, CARBON SEQUESTRATION TECHNOLOGY ROADMAP AND PROGRAM PLAN 2007 (2007). In February 2003, President Bush announced US\$ 1 billion to construct the world's first coal-based, zero-emissions electricity and hydrogen power plant, also known as FuturGen. See Statement by President Bush, White House press release, February 27, 2003, <http://www.whitehouse.gov/news/releases/2003/02/20030227-11.html>. In a February 2008 the Department of Energy effectively withdrew its support from the FuturGen project. See Andrew C. Revkin, *A 'Bold' Step to Capture an Elusive Gas Falters*, N.Y. TIMES, February 3, 2008.

³⁸ INTERNATIONAL ENERGY AGENCY, PROSPECTS FOR CO₂ CAPTURE AND STORAGE (2004); MIT, THE FUTURE OF COAL: AN INTERDISCIPLINARY MIT STUDY (2007), <http://web.mit.edu/coal/>.

It is widely acknowledged that current expenditures on energy R&D, from both public and private sources, are inadequate.³⁹ This presents a major challenge. Equally, the cycle running from innovation and through commercial deployment will need to be compressed if critical technologies are to be brought into operation at the scale to make a difference.

Finally, it must be borne in mind that fossil fuels are abundant and convenient, with few ready substitutes in sectors such as transportation, where emissions are growing rapidly. The world's poor, who tend to be on the lowest rung of the energy ladder, are indifferent to the source of improved energy services, fossil or otherwise, provided these are safe, reliable and affordable. They cannot be expected to pay a premium for more expensive, albeit cleaner, energy. Convenience and cost will always influence energy policies and as well as the choices made by households and individuals. New technologies and sources of energy face the challenge of competing with fuels that are ubiquitous, reliable and supported by well-developed, sophisticated infrastructure. The central role of energy in modern life means that this is where the battle against climate change must be joined.

The next section briefly outlines the science of climate change.

1.2 The science of climate change

The remainder of this chapter provides an overview of the science of climate change drawing largely on the reports of the Intergovernmental Panel on Climate Change (IPCC), an international, multi-disciplinary assessment body established by the United Nations.⁴⁰ The material covered is intended to frame and inform the analysis in subsequent chapters. The information is based on the consensus contained in the reports of the IPCC, especially the Fourth Assessment Report (4AR). An understanding of the general methodology employed to arrive at these consensus conclusions is important as it informs and underpins the ideas advanced in this thesis. Science is coming to the fore in new ways, influencing institutions, including those setting norms at the international level. Science influences how the problem is framed. At the same time, political processes bear on the way in which scientific output is received and used in policymaking.

1.2.1 Emission trends

The primary contributor to global climate change is carbon dioxide (CO₂), which is released by the burning of fossil fuels, as well as land-use change. CO₂ emissions from fossil fuel use have risen to 26.4 billion metric tons per year in 2000–2005, with the contribution of carbon dioxide emissions from land-use change (mainly deforestation) being estimated at 5.9 billion metric tons per year during the 1990s.⁴¹

³⁹ See for the statistics from the OECD group of industrialized countries, Doornbosch & Upton, *supra* note 30, at 31–32. They note that in most industrialized countries public sector R&D expenditure has been rising in real terms, while energy R&D has declined steeply from a peak in the early 1980s, although there are recent signs of a rise in spending.

⁴⁰ See chapter 2.

⁴¹ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *supra* note 7, at 2–3.

Beginning a sharp rise after 1945, global CO₂ emissions from fossil fuel combustion increased by over 70 per cent between 1973 and 2005.⁴² Over the period from 1990-2004, overall GHG emissions in industrialized countries experienced a slight decline, but this was largely due to a fall in emissions from countries with economies in transition as a result of economic contraction and restructuring, which offset the rise in emissions from highly industrialized countries.⁴³ In developing countries, CO₂ emissions nearly doubled between 1990 and 2002.⁴⁴ At the same time, economic growth in the large emerging economies of Asia has been significantly faster than growth in CO₂ emissions, so that their emissions intensity has fallen. The percentage rise in emissions from some developed countries such as the United States (13 per cent) and Canada (22 per cent) appears modest alongside the torrid growth rates of some developing countries, such as China (50 per cent), Indonesia (97 per cent) and the Republic of Korea (97 per cent). However, the sheer size of the United States means that its increase in CO₂ emissions was roughly equal to the combined increase from Brazil, India, Indonesia and Mexico.⁴⁵ It is worth noting that a comparatively small number of countries produce the largest share of global GHG emissions: 25 countries account for around 83 percent of global emissions.⁴⁶ The United States is the largest emitter, with 21 per cent of global emissions, followed by China with 15 percent. Some 140 countries contribute only 10 percent of annual emissions. On a per capita basis, developing regions continue to emit far less CO₂ than developed regions. Australia, the United States and Canada rank in the top ten countries with the highest per capita emissions, and their per capita emissions are more than twice those of the European Union, six times those of China, and 13 times those of India.⁴⁷ An individual in sub-Saharan Africa accounts for roughly one tenth of the CO₂ produced by an average person in the developed world.⁴⁸

1.2.2 The greenhouse gases

According to the IPCC, atmospheric concentrations of the three main greenhouse gases - carbon dioxide, methane and nitrous oxide - have increased sharply as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning thousands of years.⁴⁹ The concentration of carbon dioxide in 2005 stood at 379 parts per million (ppm), an increase of 35 per cent over the pre-industrial level of about 280 ppm. This exceeds by far the natural range over the last 650,000 years as determined from ice cores.⁵⁰ Atmospheric concentrations of methane (148 per cent) and nitrous oxides (18 per cent) have also

⁴² INTERNATIONAL ENERGY AGENCY, KEY WORLD ENERGY STATISTICS 44 (2007).

⁴³ UNFCCC SECRETARIAT, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE: THE FIRST 10 YEARS 24 (2004).

⁴⁴ WRI, *supra* note 3, at 13.

⁴⁵ *See id.*

⁴⁶ *See id.* at 11.

⁴⁷ *See id.* at 21.

⁴⁸ INTERNATIONAL ENERGY AGENCY, STATISTICS, *supra* note 42, at 48.

⁴⁹ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *supra* note 7, at 2.

⁵⁰ *See id.*

increased relative to pre-industrial levels.⁵¹ These, together with three other fluorine-containing gases, constitute the “basket” of greenhouse gases controlled under the Kyoto Protocol. Although concentrations of the industrial fluorinated gases - hydrofluorocarbons (HFCs), which are used as substitutes for ozone-depleting substances, some of which are also GHGs, perfluorocarbons (PFCs) and sodium hexafluoride (SF₆) – are only small contributors to warming, their concentrations are increasing rapidly.⁵²

The concentration of CO₂ in the atmosphere is a function of the amount of CO₂ emitted – from the burning of fossil fuels and changes in land use – and the capacity of sinks, such as the oceans and biosphere, to absorb CO₂. Over the past two hundred years the about half the carbon emitted from fossil fuel use has been absorbed by the oceans, with the rate of absorption increasing.⁵³ In the long run, the absorptive capacity of the oceans and the terrestrial ecosystems marks the ultimate stabilization level for human carbon dioxide emissions.

Greenhouse gases remain in the atmosphere for decades, with residency periods for some gases ranging from decades to hundreds of years. During their residence in the atmosphere, the molecules concerned generally retain their warming potential, meaning that those emitted today will still exert their influence years from now. Furthermore, because the oceans store and release solar energy more slowly than the air – a characteristic known as thermal inertia – some additional warming and sea level rise is already in the system. For policy makers this time lag is another reason not to delay action until the consequences of GHG emissions become fully apparent. According to the IPCC, even if GHG concentrations were held steady at 2000 levels, a further warming of 0.1 degrees Celsius per decade would be expected.⁵⁴

1.2.3 Key findings of the IPCC

The scientific consensus is reflected in the reports of the Intergovernmental Panel on Climate Change (IPCC). The latest reports date from 2007. The IPCC carries out its scientific assessment via three thematic working groups addressing: the scientific basis for climate change (WGI); the impacts, adaptation and vulnerability (WGII); and mitigation (WGIII). Each voluminous report is accompanied by a more accessible “summary for policymakers”. The Second Assessment Report, issued in 1995, stated that: “The balance of evidence suggests a discernible human influence on global climate.”⁵⁵ By the time of the Third Assessment Report, issued in 2001, the IPCC concluded that: “In the light of new evidence and taking into account the remaining uncertainties, most of the observed warming over the past 50 years is

⁵¹ See *id.* at 3.

⁵² See *id.* at 13. HFCs have been used as substitute for CFCs in refrigeration, while PFCs are emitted during the production of aluminum. Ozone depleting substances that are also GHGs are regulated under the Montreal Protocol on Substances that Deplete the Ozone Layer of 1987. The climate impact of such gases has peaked and is declining.

⁵³ Christopher L. Sabine et al., *The Oceanic Sink for Anthropogenic CO₂*, 305 (5682) SCIENCE 367 (2004).

⁵⁴ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *supra* note 7, at 12.

⁵⁵ IPCC, CLIMATE CHANGE 1995: THE SCIENCE OF CLIMATE CHANGE, CONTRIBUTION OF WORKING GROUP I TO THE SECOND ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (John Haughton et al, eds., 1996).

likely to have been due to the increase in greenhouse gas concentrations.”⁵⁶ (In the parlance of the IPCC, “likely” denotes a 60-90 per cent likelihood). The 2007 Fourth Assessment Report described warming of the climate system as “unequivocal”, based on increases in global average air and ocean temperatures and other observations.⁵⁷ It is very likely, in other words greater than 90 per cent likelihood, that most of the warming is due to the increase in the concentration of greenhouse gases from human activities.⁵⁸

Among the other key findings of the IPCC in the fourth assessment report are:

- The last 12 years (1995-2006) rank as among the 12 warmest since measurements of surface temperatures began in 1850.
- Warming during the past 100 years was 0.74 degrees Celsius, with most of the warming occurring during the past 50 years. The warming for the next 20 years is projected to be 0.2 °C per decade.
- The global increases in atmospheric carbon dioxide concentrations are due to fossil fuel use and land-use changes (deforestation).
- Atmospheric concentrations of carbon dioxide in 2005 exceeded by far the natural range over the past 650,000 years.
- Various long-term changes in climate have been observed, including rising Arctic temperatures and reduced sea ice, the frequency of heavy precipitation events (flooding) has increased, as have change in extreme temperatures (more hot days and heat waves).

In understanding temperature projections, a number of things ought to be borne in mind: first, this is a global average, meaning that some regions, such as the sub-Arctic regions, have warmed by as much as double that;⁵⁹ second, this warming is likely to have been the largest of any century during the past 1000 years; third, ecological systems, and the social systems dependent on them, are complex and sensitive, so that even seemingly small shifts in temperature may have unpredictable consequences.

1.2.4 Climate impacts

Human systems that are sensitive to climate change include water resources, agriculture and forestry, fisheries, human settlements and human health. Projected impacts are largely negative – aside from increased potential crop yields in some regions at mid-latitude, increased water supply in some water-scarce regions such as South-East Asia, and reduced energy demand for space heating due to higher winter temperatures.⁶⁰ Potential adverse impacts include a general reduction in crop yields in

⁵⁶ IPCC, CLIMATE CHANGE 2001: THE SCIENTIFIC BASIS, CONTRIBUTION OF WORKING GROUP I TO THE THIRD ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 10 (John Houghton et al eds., 2001).

⁵⁷ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *supra* note 7, at 5.

⁵⁸ *See id.* at 5, 10.

⁵⁹ *See id.* at 7.

⁶⁰ IPCC, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY, CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Martin L. Parry et al eds., 2007).

most tropical and sub-tropical regions; decreased water availability in many water scarce regions, particularly in the sub-tropics; an increase in the number of people exposed to vector-borne diseases (malaria) and water-borne diseases, and increase in heat stress mortality; a widespread increase in the risk of flooding and from heavy precipitation events and sea-level rise; and increased energy demand for space cooling due to higher summer temperatures.⁶¹

According to the IPCC, by mid-century, annual average river runoff and water availability will increase at high latitudes and in some wet tropical areas, but will decrease by 10-30 per cent over some dry regions at mid-latitudes and in the dry tropics. Some of the affected areas are water stressed, and coincide with regions where poverty is widespread, for example Africa. Provision of clean drinking water is a key challenge in developing countries, where currently some 1.1 billion people lack access to safe water and 2.6 billion lack access to improved sanitation. Linked to this are 4 billion cases of diarrhea per year, which cause 1.8 million deaths, mostly among children under five.⁶²

Climate change will also have an uneven impact on food production. Moderate temperature increases will see a rise in productivity at the global level, but at lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), increasing risk of hunger.⁶³ Increased CO₂ concentrations stimulate crop growth and yield, but the negative effects of heat and drought may counteract this effect. Recent research that compared actual data on rice yields and temperatures over 25 years found that crop yields had dropped by 10 per cent.⁶⁴ In some African countries, yields from rain-fed agriculture could be reduced by up to 50 per cent by 2020. Farmers in such areas are unlikely to be able to afford adaptive technologies such as improved irrigation or new cultivars.

There is evidence that climate change is already having adverse impacts on health, for instance in the case of increased mortality from heat waves.⁶⁵ Projected health impacts of climate are likely to affect millions of people, particularly the poor and those lacking access to medical care, through increased deaths resulting from heat waves and higher incidence of waterborne disease, such as diarrhea. While it is true, as is sometimes contended, argued that public health interventions can cope with the spread of diseases resulting from climate change, this cannot necessarily be said of developing countries characterized by weak public health systems.

A range of natural systems – the IPCC specifically mentions coral reefs, glaciers, atolls, and mangroves – are at risk from climate change. A key factor in determining impact is the rate of change – in many cases ecosystems that have in

⁶¹ See *id.* at 16.

⁶² UNICEF & WHO, MEETING THE MDG DRINKING WATER AND SANITATION TARGET: A MID-TERM ASSESSMENT (2004).

⁶³ IPCC, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY, *supra* note 60, at 11.

⁶⁴ The fact that warming leads to increased night-time temperatures, when rice plants respire, is behind the adverse impact. See Fred Pearce, *Rice Yields Plummet Due to Balmy Nights*, NEW SCIENTIST, June 29, 2004, accessible at <http://www.newscientist.com/news/news.jsp?id=ns99996082>; Shaobing Peng et al, *Rice yields decline with higher night temperature from global warming*, 101(27) PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES 9971-9975 (2004).

⁶⁵ IPCC, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY, *supra* note 60, at 9.

past adapted to gradual temperatures may simply not be able to adapt to such comparatively rapid change. Understanding the adaptive capacity of ecosystems is complex, research indicates that climate change is already having an impact on biodiversity and could rival habitat destruction as a cause of extinctions.⁶⁶ In coral reefs mild temperature changes, in the range of 1-2 degrees Celsius, can result in “bleaching” – the expulsion of the symbiotic algae that nourish the coral polyps.⁶⁷ A majority of corals are expected to exceed their bleaching thresholds by 2030 to 2050.⁶⁸ Furthermore, recent studies suggest that the absorption of CO₂ by the oceans has reduced the natural alkalinity of seawater, which could have a negative effect on the reef-building ability of corals and shell production in some mollusks and plankton.⁶⁹ On land, fragile mountain ecosystems also face rapid change.⁷⁰ The IPCC states that there has been widespread retreat of mountain glaciers in non-polar regions during the 20th century.⁷¹ In the Andes it is estimated that glaciers have retreated by as much as 25 per cent in the last 30 years, which could mean water shortages in the future.⁷²

The global mean sea level is projected to rise by 0.18 to 0.59 meters by the last decade of the 21st century, largely due to the thermal expansion of the oceans and freshwater inflows from melting glaciers and ice caps.⁷³ Low-lying islands and the mega-deltas of Africa (Nile) and Asia (Bangladesh) are most at risk from the risk from rising seas. The effects of rising sea levels and storm surges are already being experienced in the form of accelerated coastal erosion, forcing some communities to contemplate retreat from the ocean or the construction of costly coastal defenses.⁷⁴ Rising sea levels from thermal expansion are projected to continue for hundreds of years after the stabilization of GHG concentrations (even at present levels), as a consequence of time it takes for the deep ocean layers to adjust to warming. Similarly, melting ice sheets will feed rising sea levels thousands of years after emissions have stabilized. While recent years have witnessed dramatic collapses of ice

⁶⁶ James Gorman, *Scientists Predict Widespread Extinction by Global Warming*, N.Y. TIMES, January 8, 2004, at A4. MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: CURRENT STATE AND TRENDS, FINDINGS OF THE CONDITION AND TRENDS WORKING GROUP (2005).

⁶⁷ ROBERT W. BUDDEMEIER ET AL, CORAL REEFS AND GLOBAL CLIMATE CHANGE: POTENTIAL CONTRIBUTIONS OF CLIMATE CHANGE TO STRESSES ON CORAL REEF ECOSYSTEMS (Report Prepared for the Pew Center on Global Climate Change, 2004).

⁶⁸ IPCC, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY, *supra* note 60, at 235.

⁶⁹ Andrew C. Revkin, *Carbon Dioxide Extends its Harmful Reach to Oceans*, N.Y. TIMES, July 20, 2004, F3. See also Sabine, *supra* note 53, at 367-371; Richard A. Feely et al, *The Impact of Anthropogenic CO₂ on the CaCO₃ System in the Oceans*, 305 (5682) SCIENCE 362-366 (2004).

⁷⁰ E.g., alpine meadows in the Rocky Mountains are likely to disappear. See U.S. DEPARTMENT OF STATE, THE UNITED STATES OF AMERICA'S THIRD NATIONAL COMMUNICATION UNDER THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (2002). Andean cloud forests, a biodiversity “hotspot” are another example of an ecosystem at immediate risk. See Mark B. Bush et al, 48, *000 Years of Climate and Forest Change in a Biodiversity Hot Spot*, 303(5659) SCIENCE 827 (2004).

⁷¹ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *supra* note 7, at 5.

⁷² Juan Forero, *As Andean Glaciers Shrink, Water Worries Grow*, N.Y. TIMES, November 24, 2002, at A3.

⁷³ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *supra* note 7, at 13-14. Sea-level estimates from the Fourth Assessment are for 2090-2099.

⁷⁴ *Massachusetts v. EPA* 127 S. Ct. 1438 (2007). The Court found that the Commonwealth of Massachusetts had standing to sue the EPA for denial of a rulemaking petition under the Clean Air Act, based actual and imminent harm, including damage to coastal areas caused by rising sea-levels.

shelves – masses of floating ice that are extensions of terrestrial ice sheets – these do not have any effect on sea levels.⁷⁵ If fully melted, the Antarctic and Greenland ice sheets hold enough water to raise global sea levels by 64 meters.⁷⁶ Recent research suggests that the Antarctic ice sheet appears to be losing mass, in part due to accelerated ice flows, but significant uncertainty remains.⁷⁷ There is somewhat greater certainty that loss of ice mass is occurring in Greenland, driven by increased melting and accelerated ice flow.⁷⁸

Besides raising sea levels, the inflow of freshwater from the melting Greenland ice cap could contribute to a slowing of the ocean conveyor during the 21st century, but a halt is regarded as unlikely.⁷⁹ The ocean circulation occurs as cold, dense water near Iceland and Greenland sinks and flows southward in the deep as warm water from the tropics drifts slowly northward nearer the surface, allowing Northern Europe to enjoy a climate significantly milder than it otherwise would given its latitude. A weakening of the circulation would lead to a reduction of heat transport to the Northern Hemisphere, but models nonetheless project a warming over Europe due to increased GHGs.⁸⁰ There is some evidence that salinity in the deep water of the North Atlantic and Arctic has decreased, with increased salinity observed in the tropical Atlantic.⁸¹ Other irreversible changes with major impacts but low probabilities include accelerated global warming due to carbon cycle feedbacks in the terrestrial biosphere and releases of terrestrial carbon from permafrost regions and methane from hydrates in coastal sediments.⁸²

Potentially serious impacts may also result from the increase in climate extremes, as reflected in the damage caused by droughts, floods, heat waves and windstorms. The IPCC states that it is very likely (greater than 90 per cent likelihood) that hot extremes, heat waves and heavy precipitation events will increase in frequency.⁸³ Although it is methodologically not possible to establish a causal link between specific instances of more extreme or frequent extreme events and climate

⁷⁵ The Larsen B ice shelf in Antarctica, 200 meters thick and 3,250 square kilometers in size, collapsed suddenly in March 2002. See Andrew C. Revkin, *Large Ice Shelf in Antarctica Disintegrates at Great Speed*, N.Y. TIMES, March 20, 2002, at A13.

⁷⁶ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *supra* note 7, at 361.

⁷⁷ See *id.* at 361.

⁷⁸ Andrew C. Revkin, *An Icy Riddle as Big as Greenland*, N.Y. TIMES, June 8, 2004, at F1. Research indicates that inland melting can have outsize effects on the ice sheets because meltwater formed on the surface percolates down through cracks in the ice, acting like a lubricant causing ice to slide more smoothly over the bedrock and onward to the sea.

⁷⁹ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *supra* note 7, at 16.

⁸⁰ See *id.*

⁸¹ See Bob Dickson et al, *Rapid Freshening of the deep North Atlantic Ocean over the past four decades*, 416 NATURE 832 (2002); Bogi Hansen, *Decreasing overflow from the Nordic seas into the Atlantic Ocean through the Faroe Bank channel since 1950*, 411 NATURE 927 (2001). Researchers found that hydrographic records and other observations show that the flows of cold, dense water from near Greenland and Iceland to the Atlantic had decreased. The water that cools and becomes dense near Greenland sinks, but before it can drive the circulation effectively it must push cold bottom water over the sills of the Greenland-Scotland ridge and into the deep Atlantic.

⁸² IPCC, CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY, CONTRIBUTION OF WG II TO THE THIRD ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 6 (Osvaldo F. Canziani et al, eds., 2001).

⁸³ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, *supra* note 7, at 15.

change, it is likely that the increase in some areas in droughts and more intense high precipitation events is the result of climate change. The summer of 2003 saw record temperatures across Europe. The heat wave was blamed for unusually high mortality in France and elsewhere in Europe.⁸⁴ By the reckoning of the insurance industry there has been an increase in the frequency of extreme weather events and a concomitant increase in losses from weather-related events.

Climate change will have a disproportionate effect on developing countries, especially the least developed countries. The reasons are twofold. First, the ability of human systems of adapt to and cope with climate change depends on factors such as wealth, technology, education, skills, infrastructure, access to resources, and management capabilities. For instance, while the Netherlands, with some half its surface area below sea level has the resources to further enhance its very extensive (and expensive) system of dykes and controls, a nation such as Bangladesh simply cannot afford similar protective measures. Developing countries lack adaptive capacity and more vulnerable to climate change, as they are to other stresses. Second, regional projections, although not perfect, provide an outline of more severe impacts in regions where most developing countries are situated. Examples are the likelihood of increased drying over mid-latitude continental interiors, with decreased water availability in water scarce regions, a reduction in crop yields in most tropical and sub-tropical regions, and flooding from heavier rainfall, as well as sea level rise, which is already impacting island states. Populations reliant on rain-fed subsistence agriculture that lack access to technology (drought resistant crops) and live in geographical areas that will be hard hit (such sub-Saharan Africa) are therefore doubly at risk. The distribution of impacts and the relative capacity to adapt raises questions of equity and sustainable development.

1.2.5 Uncertainties and feedbacks

Scientists studying climate change are usually quick to acknowledge the uncertainties that accompany their findings. Estimates of emissions suggest a doubling of CO₂ concentrations by mid-century, resulting in a warming of more than 1 to nearly 6 degrees Celsius by the end of the 21st century.⁸⁵ Warming at the upper end of this range, more likely for tripling of CO₂, could very well trigger to large-scale, irreversible events such as massive flooding from melting of the Antarctic ice sheets, with a dramatic effect on human and natural systems. While future climate change was once regarded as a gradual warming, it is now accepted that abrupt, non-linear change is a possibility. Abrupt climate change can occur when the Earth system is pushed across a threshold, either by a natural occurrence, such as a volcanic eruption, or possibly forcing from anthropogenic emissions.⁸⁶ Scientists and policymakers alike face challenges when dealing with uncertainty. It is difficult to

⁸⁴ The French Health Ministry estimated that there were an estimated 11 435 additional deaths during the first two weeks of August than in the same period during recent years. See *Heat wave killed 11,000 in France*, ASSOCIATED PRESS, August 29, 2003. According to the insurer Munich Re, the heat wave caused some 20 000 deaths in Europe and resulted in property damages of US \$13 billion. See MUNICH RE, TOPICS GEO ANNUAL REVIEW: NATURAL CATASTROPHES 2003 23-25 (2004), available at <http://www.munichre.com>.

⁸⁵ IPCC, CLIMATE CHANGE 2001: THE SCIENTIFIC BASIS, *supra* note 56, at 12-13.

⁸⁶ NATIONAL ACADEMY OF SCIENCES ABRUPT CLIMATE CHANGE: INEVITABLE SURPRISES (2002).

incorporate low probability, high impact events into models and assessments, so that most researchers produce analyses that are essentially surprise free.⁸⁷

At times the media, when it takes note of the issue, seizes on the remote, catastrophic possibilities, ignoring the less head-line-grabbing aspects of climate change. There is also a tendency to equate local experiences of extreme weather events with climate change; global warming entered the public consciousness in the United States in 1988, in the middle of a heat wave, and a more recent surge interest can probably be attributed to Hurricane Katrina, as well as the Al Gore documentary, *An Inconvenient Truth*. In many cases scientists, while agreeing that change is occurring, disagree about the severity, the timescales involved, or even the cause. The process of testing hypotheses leaves specific questions unanswered, with in contradictory explanations being posited, to be resolved only through new observations or improved computer modeling. The existence of complex interactions and feedbacks in the climate system sometimes contributes to the lack of ready-made and definitive answers. This should not, however, detract from the urgent need for action, particularly because in many cases climate impacts will be irreversible. Early action also constitutes a form of insurance against climate “surprises”.

1.3 Thesis outline

The thesis continues in chapter two with an examination of the institutional dimension of climate change science and the process of integrating contested knowledge into the climate change regime. The widely held view that scientific conclusions are properly arrived at in isolation from policy-making and politics is increasingly being challenged. Rather, it is increasingly recognized that science is subjected to the push and pull of various stakeholder interests, and its claims to validity are contested. This leads to the question of which interests are advanced in the interaction between the climate science assessment process and international policymaking. How does the assessment process contribute to setting the climate change agenda? How does the politics around climate change interact with and potentially influence “accepted” conclusions in science of climate change? The role of science in policymaking at the national level has been studied extensively;⁸⁸ rather less attention has been paid to science and its role in international environmental governance. By examining the genesis and working methods of the Intergovernmental Panel on Climate Change (IPCC), this chapter highlights the manner in which the science has influenced the political process and the creation of new norms at the international level. It will be seen that the politics around the international climate change negotiating process had a major hand in shaping the IPCC, a unique institution that operates on the basis of intergovernmental consensus, but at the same time must maintain its scientific credibility.

⁸⁷ Stephen H. Schneider & Kirstin Kuntz-Duriseti, *Uncertainty and Climate Change Policy*, in CLIMATE CHANGE POLICY: A SURVEY 58 (Stephen H. Schneider et al eds., 2002).

⁸⁸ Sheila Jasanoff, *Contingent Knowledge: Implications for Implementation and Compliance*, in ENGAGING COUNTRIES: STRENGTHENING COMPLIANCE WITH INTERNATIONAL ENVIRONMENTAL ACCORDS 63 (Edith Brown Weiss & Harold K. Jacobson, eds., 1998); YARON EZRAHI, *THE DESCENT OF ICARUS: SCIENCE AND THE TRANSFORMATION OF CONTEMPORARY DEMOCRACY* (1990).

The third chapter provides an overview of the United Nations Framework Convention (UNFCCC) and its Kyoto Protocol in greater detail. The chapter covers the genesis of these two instruments and introduces their key provisions. It then goes on to trace the operation and elaboration of the climate change regime through successive meetings of supreme bodies of these two instruments, respectively the Conference of the Parties (COPs) of the UNFCCC and Conference of the Parties serving as the Meeting of the Parties (COP/MOP) to the Kyoto Protocol.

Chapter four maps out various approaches and conceptions to fairness. Fairness and equity claims are a major part of the climate change regime. The Framework Convention - the universally accepted legal instrument for action to combat climate change - assigns a prominent place to equity.⁸⁹ In December 2007, the parties agreed to launch negotiations on a post-2012 climate agreement, which to be successful will need to deliver both bigger emission cuts and engage a wider group of states than is currently the case under the Kyoto Protocol. The climate policy negotiated in the next few years will decide how the burden of responding to climate change will be apportioned. It is no surprise then that equity and fairness concerns are moving into the limelight. The analysis in this chapter aims to outline the foundations of fairness and equity, before moving on to identify a number of principles that could contribute to a rough, working consensus on fairness and equity in climate change. While general dimensions of fairness are considered, the analysis focuses on allocating responsibility for addressing climate change through mitigation action.

Having analyzed fairness at a theoretical level in the previous chapter, chapter five proceeds to identify and analyze the fairness and equity principles embedded in the Convention and the Protocol. Extensive reference is made to the principle of common but differentiated responsibilities, which is a mainstay of the international discourse on climate change. As potential examples of fairness and equity in practice, the implementation of provisions relating to technology transfer and financial assistance are also examined in more detail.

Chapter six evaluates a selection of proposals for a future climate policy against the equity and fairness principles identified in chapter four, as well as a set of policy criteria. A good, albeit preliminary, indication of the usefulness of equity and fairness principles would appear from the extent to which climate change policy proposals do – or do not - reflect a balance of equity principles. This chapter also identifies and applies a selection of policy assessment criteria drawn from the literature. At this point it should be noted that to a considerable degree the discussion of equity and fairness in chapters four and five could be applicable to both adaptation to the impacts of climate change and the mitigation of greenhouse gas emissions. Both adaptation and mitigation are undeniably important. The focus in chapter six, however, is on mitigation and, in particular, specific proposals for climate policy, the emphasis of which tends to be on mitigation efforts. This word of

⁸⁹ The European Commission and 191 States have ratified or acceded to the Convention, leaving as the only non-parties Andorra, The Holy See, Iraq and Somalia. See website of the UNFCCC secretariat, http://unfccc.int/files/essential_background/convention/status_of_ratification/application/pdf/unfccc_conv_rat.pdf (last accessed 7 February 2008).

caution is necessary because adaptation raises equity concerns that, while important, fall outside the scope of this thesis.⁹⁰

The conclusion seeks to draw together the strands of the analysis, and then proceeds to make a number of proposals for future climate policy. It is suggested that these proposals would contribute to a post-Kyoto climate agreement that is consonant with fairness and equity principles as articulated in the prior analysis, while also being capable of implementation taking into prevailing economic and political realities.

⁹⁰ For a discussion of fairness in the context of adaptation, see *FAIRNESS IN ADAPTATION TO CLIMATE CHANGE* (Neil Adger et al, eds., 2006).

Chapter 2 - Science and politics

2.1 Climate change as a policy concern

During the course of the 19th and early 20th centuries a number of attempts were made to improve the understanding of the relationship between the surface temperature of the Earth and the chemical composition of the atmosphere.¹ From the 1950s onwards, scientists continued assemble the various pieces of the puzzle, working on such projects as accurately measuring CO₂ concentrations in the atmosphere to detecting samples in ice cores. These scientists were working in different disciplines, within national funding priorities and disconnected from an international legal or institutional framework concerning climate change. A further development began to take place when the scientific concern started to be reflected in the national and international policy agenda. A key step was the awareness of environmental issues that came about following the United Nations Conference on Human Development, held in Stockholm in 1972. Although environmental agenda that flowed from Stockholm tended to focus on tackling particular pollutants whose effect was generally local such as oil spills, the heightened awareness of environmental degradation ushered in by Stockholm did set the stage for international and intergovernmental attention to climate change.

A tentative step in the migration from the realm of science to that of policy occurred in 1979, with the First World Climate Conference in Geneva, at which the World Climate Research Programme (WCRP) was launched, setting in motion a series of international meetings organised under the auspices of the World Meteorological Organization (WMO), the United Nations Environment Programme (UNEP), and the International Council of Scientific Unions (ICSU).² At the Villach conference in Austria in 1985, an international group of scientists reached the consensus conclusion that as a result of an increase in the concentration of greenhouse gases a significant rise in global mean temperatures could occur in the next century and that States should initiate consideration of developing a climate change convention. This and other international meetings, as well as the activities of national research bodies, resulted in a significant degree of consensus-building among climate scientists. Attempts made to expand the research agenda under the umbrella of the ICSU brought together the geophysical and biological sciences in an International Geosphere-Biosphere Programme (IGBP).³

The emerging concern among scientists would probably not have been sufficient to lead to political action had it not been for number of additional factors.⁴ First, the immediate threat posed by the “ozone hole” alarmed the public and galvanized politicians into action; it was an important example of scientific advice appearing to play a key role in initiating an international agreement. The geophysical

¹ See chapter 1.

² Tora Skodvin, *The Intergovernmental Panel on Climate Change, in SCIENCE AND POLITICS IN INTERNATIONAL REGIMES: BETWEEN INTEGRITY AND INVOLVEMENT* 164 (Steinar Andresen, Tora Skodvin, Arild Underdal & Jorgen Wettestad, eds., 2000).

³ SPENCER R. WEART, *THE DISCOVERY OF GLOBAL WARMING* 151-152 (2003).

⁴ Daniel Bodansky, *The United Nations Framework Convention on Climate Change: A Commentary* 18 YALE J. INT'L L. 451, 460-461 (1993)

research had borne fruit with the identification of the hazards posed to the ozone layer. When evidence of effect of chlorofluorocarbons (CFCs) emerged, states adopted the Vienna Convention for the Protection of the Ozone Layer⁵ and its Montreal Protocol that provided for the phasing out of ozone depleting substances.⁶ Second, a number of leading scientists acted to raise the profile of climate change as an issue at every opportunity.⁷ Finally, several authors have attributed the increased public awareness of climate change to the effect of the unusual weather events of 1988 – a series of heat waves struck the United States – and the hearings on climate change held before the United States Congress.⁸

A further milestone in the process of bringing climate change to the attention of policy makers occurred in 1988 at the “World Conference on the Changing Atmosphere: Implications for Global Security”, known as the Toronto Conference. Some 340 individuals, among them more than one hundred government officials, as well as scientists, industry representatives and environmentalists participated in the meeting.⁹ Government officials did not attend in their representative capacities, and the meeting was not vested with a formal mandate; nonetheless, the Conference issued an influential set of recommendations, including that by 2000 global CO₂ emissions should be cut by 20% below 1988 levels, and that States should develop a comprehensive framework convention on the law of the atmosphere. The Toronto Conference is generally seen as a turning point as far as the discussion of climate change as an international issue is concerned.

2.2 Establishing the IPCC

Even as climate change gained in public prominence the first steps were already being taken to address climate change at the intergovernmental level. A sometimes-overlooked fact is that the movement to establish the Intergovernmental Panel on Climate Change (IPCC) had been set in motion well before the Toronto Conference and in advance of the hot summer of 1988. A close observer traces the genesis of the IPCC to the activism of the Director of United Nations Environment Programme (who had written to the US administration suggesting a climate convention), the dissatisfaction of the US with an early international panel to study the issue, and the disagreement on the climate change issue between the various U.S. agencies.¹⁰ A crucial actor was the United States, which as the largest greenhouse gas

⁵ Vienna Convention for the Protection of the Ozone Layer, March 22, 1985, 1513 U.N.T.S. 293.

⁶ Montreal Protocol on Substances that Deplete the Ozone Layer, September 16, 1987, 26 ILM 1541, 1522 U.N.T.S. 3. The text of Montreal Protocol as amended is available on the website of the Ozone Secretariat at <http://www.unep.org/ozone/pdfs/Montreal-Protocol2000.pdf>

⁷ Bodansky, *supra* note 4, at 460-461.

⁸ WEART, *supra* note 3, at 154-155; WILLIAM K. STEVENS, *THE CHANGE IN THE WEATHER: PEOPLE, WEATHER AND THE SCIENCE OF CLIMATE* 132-133 (2001).

⁹ Bodansky, *supra* note 4, at 461-462.

¹⁰ SHARDUL AGRAWALA, *EXPLAINING THE EVOLUTION OF THE IPCC STRUCTURE AND PROCESS*, 5 (ENRP Discussion Paper E-97-05, Kennedy School of Government, 1997). Bodansky *supra* note 4, at 464 points out that the United States, before any other Western country, approached climate change from an economic perspective, due to the involvement of domestic bureaucratic actors such as the Departments of Energy, Interior and Commerce. See also SONJA BOEHMER-CHRISTIANSEN AND AYNLEY KELLOW, *INTERNATIONAL ENVIRONMENTAL POLICY: INTERESTS AND THE FAILURE OF THE KYOTO PROCESS* 131 (2002). Boehmer-Christiansen and Kellow support the view that

emitter had a great deal at stake in relation to potential mitigation measures. A powerful domestic fossil fuel lobby was also in a position to have its voice heard. Lastly, the various agencies had significant experience with domestic with climate assessment programs.¹¹ Against this backdrop the proposal for an intergovernmental scientific assessment process was regarded as a good option, serving also to assert governmental control over the assessment process, which had been begun earlier under the auspices of the Advisory Group on Greenhouse Gases, a body composed of scientists that was not affiliated with governments, and which was involved in carrying out early assessments.¹²

In May 1987 the Executive Council of the World Meteorological Organization (WMO) requested its Secretary-General, “in coordination with the Executive Director of UNEP to establish an intergovernmental mechanism to carry out internationally coordinated scientific assessments of the magnitude, impact and potential timing of climate change”.¹³ In turn, the UNEP Governing Council adopted a resolution welcoming the WMO initiative and requesting Executive Director to work with WMO to establish such an intergovernmental assessment body.¹⁴ Discussions among these two bodies and member countries, especially the United States, led to drawing up of the tentative terms of reference of the Intergovernmental Panel on Climate Change (IPCC), as it came to be known. As has been pointed out, a number of key decisions were made at this early stage, prominent among them the decisions to opt to bestow a comprehensive assessment mandate on the IPCC, looking at the science, the impacts of climate change and responses.¹⁵ Ahead of the first meeting of the IPCC in November 1988, Malta introduced an agenda item entitled “Conservation of climate as part of the common heritage of mankind” in the United Nations General Assembly. The resolution that was adopted endorsed the decision to establish the IPCC and requested the Secretary-General of the WMO and the Executive Director of UNEP, through the IPCC, to begin a comprehensive review and to make “recommendations with respect to: (a) the state of knowledge of the science of climate and climatic change; (b) programmes and studies on the social and economic impact of climate change, including global warming; (c) possible response strategies to delay, limit or mitigate the impact of adverse climate change; (d) the identification and possible strengthening of relevant existing international legal instruments having a bearing on climate; [and] (e) elements for inclusion in a possible future international convention on climate.”¹⁶

governments, particularly the U.S., wished to re-assert control over the climate assessment process from the Advisory Group on Greenhouse Gases (AGGG), which had been formed at Villach in 1985.

¹¹ AGRAWALA, *supra* note 10, at 3.

¹² Shardul Agrawala, *Early Science-Policy Interactions in Climate Change: Lessons from the Advisory Group on Greenhouse Gases*, 9(2) GLOBAL ENVIRONMENTAL CHANGE: HUMAN AND POLICY DIMENSIONS 157 (1999); BOEHMER-CHRISTIANSEN & KELLOW, *supra* note 10, at 30.

¹³ *Report of the Thirty-Ninth Session of the Executive Council*, June 1-5, 1987, 7, WMO Doc. 687 (1987).

¹⁴ *UNEP: Report of the Governing Council*, U.N. GOAR, 42nd Sess., Supp. No. 25, U.N. Doc. A/42/25 (1987). (See also Jack Fitzgerald, *The Intergovernmental Panel on Climate Change: Taking the First Steps Towards a Global Response*, 14 SOUTHERN ILLINOIS UNIVERSITY LAW JOURNAL 231 (1990).

¹⁵ AGRAWALA, *supra* note 10, at 9.

¹⁶ G.A. Res. 43/53, paras. 5 and 10, U.N. Doc. A/RES/43/53. The draft resolution referred to the climate as the “common heritage of mankind”, but this was later changed to refer to climate change as the “common concern of mankind” (para. 1).

2.2.1 Working methods of the IPCC

The IPCC is an intergovernmental body, carrying out a scientific assessment function; participation is open to all Member countries of the UNEP and the WMO.¹⁷ Reports of the IPCC are subjected to both peer and government review. The Panel, its Working Groups and task forces established endeavor to reach decisions on the basis of consensus. Where this is not possible in relation to reports, differing views are explained; disagreements on scientific, technical or socio-economic questions are to be appropriately represented in the relevant document.¹⁸ Generally, the reports of the IPCC tend towards a centrist position – the combination of intensive peer review and review by governments tends to weed out extreme positions. Its plenary (the Panel) consists of government representatives, who usually meet at least once a year. As is the norm for United Nations intergovernmental bodies, the IPCC is headed by a bureau, which consists of a Chair and three vice-chairs. Two co-chairs and a number of vice-chairs head each of the three Working Groups.¹⁹ Membership in the bureaus of the IPCC and its Working Groups is by election; elections are held approximately every five years. Unlike plenary sessions of the Panel, where governmental representatives are present, bureau members are in the first order scientific and technical experts and not acting under instructions from their countries of nationality. Nonetheless, they are selected on the basis of a regional formula to provide for geographic balance; furthermore, for some time it has been a practice that one co-chair of each WG should be from a developing country. It is common for the bureau of the IPCC to meet two to three times a year, usually in the days prior to the plenary sessions of the Panel, to plan, monitor and coordinate the work of the IPCC.

The work of the IPCC is organized around assessment cycles, with assessment reports being published about twice a decade. Since its establishment the IPCC has completed four assessment reports - the first in 1990 and the most recent in 2007. The IPCC has also produces special reports designed to provide, on shorter schedule, assessments relevant to decision-makers.²⁰ The assessment cycle – from the drawing up of the work program to the publication of the report – lasts about four years. It begins with a plenary session of the Panel, which sets the agenda and work program for the forthcoming assessment.²¹ The Working Groups, based on the program of work and general outlines set by the Panel, develop more detailed outlines for each part (volume) of the assessment, which are then accepted by the Panel at one of its sessions.²² Thereafter nominations for experts are invited from

¹⁷ *Principles Governing IPCC Work*, approved at the Fourteenth Session (Vienna, 1-3 October 1998) on 1 October 1998, and amended at the 21st Session (Vienna, 3 and 6-7 November 2003), available at <http://www.ipcc.ch/about/procd.htm>.

¹⁸ *Id.*

¹⁹ *Report of the Nineteenth Session of the Intergovernmental Panel on Climate Change*, Geneva, Switzerland, 17-20 September 2002, Appendix H, available at <http://www.ipcc.ch/meet/rep19session.pdf>.

²⁰ AGRAWALA, *supra* note 10, at 23.

²¹ WMO & UNEP, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: 16 YEARS OF SCIENTIFIC ASSESSMENT IN SUPPORT OF THE CLIMATE CONVENTION 5 (2004), available at <http://www.ipcc.ch/pdf/10th-anniversary/anniversary-brochure.pdf>.

²² See e.g., *Draft Report of the Twenty-first Session of the Intergovernmental Panel on Climate Change*, Vienna, Austria, 3 and 6-7 November 2003, available at <http://www.ipcc.ch/meet/drepipcc21.pdf>.

governments and international organizations. The bureaus of the Working Groups finalize the writing teams for each respective Working Group report.²³ Each writing team works in coordination with its respective Working Group Chair, Bureau and Technical Support Units to draft their relevant section of the IPCC report in an iterative process that typically takes between one and one-and-a-half years.²⁴

2.2.2 Peer review

Every chapter of a draft IPCC report undergoes an intensive review process. Agrawala notes that draft chapters of the 1995 Working Group II Second Assessment report underwent a first review involving between twenty to sixty expert reviewers per chapter, with a total of 700 experts from 58 countries.²⁵ This was followed by a second review involving all IPCC member governments, as well as the experts who had submitted reviews in the first round. The practice of peer review in the IPCC has developed from the less regulated format common and understood among small groups of scientists into a more formal procedure. Outside criticism has played its part²⁶, leading to the adoption of formal rules governing the peer review procedure.²⁷

Peer review is among the oldest certification processes in science, and its primary purpose is to strengthen the quality of work by making it undergo criticism and evaluation at the hands of those best qualified to judge it.²⁸ The process has been faulted for failing as a reliable way to gauge research quality²⁹ It has been argued that these criticisms rest on a particular conception of peer review as a type of “truth machine” that weeds out “bad science”, resting on the implicit assumption that scientists agree closely on most things.³⁰ In fact, it may be that disagreement among

²³ The bureau selects the coordinating lead authors and lead authors, who in turn select the contributing authors for the report. The bureau is also responsible for choosing review editors. Their tasks are to ensure consistency in the relevant report and that authors take account of comments received in the course of the peer review process.

²⁴ AGRAWALA, *supra* note 10, at 11.

²⁵ *Id.*

²⁶ In a notorious case, Dr. Frederick Seitz, a physicist, alleged in an article in the *Wall Street Journal* op-ed page that the lead authors of a chapter in the WG I contribution to the 1995 Second Assessment Report had “corrupted the peer review process”. See Paul N. Edwards & Stephen H. Schneider, *Self-Governance and Peer Review in Science-for-Policy: The Case of the IPCC Second Assessment Report*, in CHANGING THE ATMOSPHERE: EXPERT KNOWLEDGE AND ENVIRONMENTAL GOVERNANCE 219 (Clark A. Miller and Paul N. Edwards, eds., 2001). Edwards and Schneider examine the incident in detail and ultimately conclude that the charge was baseless and that the scientists in question acted properly. See also STEVENS, *supra* note 8, at 226-233, who provides further background to the incident, leaving the clear impression that that the attacks were less than honest and more concerned with discrediting the findings of the IPCC than with any flaws in the IPCC process. See further ROSS GELBSPAN, *THE HEAT IS ON: THE HIGH STAKES BATTLE OVER THE EARTH’S THREATENED CLIMATE* (1997).

²⁷ See for applicable rules, *Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports*, adopted at the Fifteenth Session of the IPCC (San Jose, 15-18 April 1999) and revised, on a provisional basis, at the Twentieth Session of the IPCC (Paris, 19-21 February 2003).

²⁸ Edwards & Schneider, *supra* note 26, at 229.

²⁹ *Id.* at 230, provide examples of studies, including one where experiments showed that agreement between referees on the same article was only slightly better than chance. Other critiques are that peer review tends to be biased towards confirming existing beliefs, regardless of their quality.

³⁰ *Id.* at 231-232.

scientists is more common -and acceptable- than some have supposed. According to Edwards and Schneider: “We maintain that peer review ought to be regarded as a human process whose primary functions are to improve the quality of scientific work, to maintain accountability both inside and outside the scientific community, and to build a scientific community that shares core principles and beliefs even when it does not agree in detail.”³¹ In this view the peer review has the aim of minimizing disagreements, but cognizant that disagreement is part and parcel of science as a human practice. Perhaps most important of all, in relation to the IPCC, peer review plays a major role in establishing the credibility of expert knowledge for policy purposes.³² It is no accident that when reference is made to the IPCC’s conclusions the number of scientists is prominently mentioned, all but a few of whom will have been engaged in reviewing and commenting on the work of the much smaller number of lead and contributing authors.

In the preparation of reports, the Working Group lead authors draw on peer-reviewed and internationally-available literature, as well as the submissions of experts, where these are also based on peer-reviewed literature. The terms under which recourse may be had to non-peer-reviewed literature and unpublished material are specified in the IPCC’s procedures.³³ Where there is significant scientific or technical support for disparate views, lead authors are required to identify these in the draft report. The IPCC procedures explicitly spell out the principles governing the review process- inclusion of the best possible scientific and technical advice, a wide circulation to ensure representation of independent experts, and objectivity, openness and transparency. To ensure that reports provide a balanced and complete assessment of current information, each Working Group selects two Review Editors, one of whom is normally a member of the bureau of the Working Group and the other an independent expert; neither should be involved in the preparation or review of material for which they are an editor. Review Editors, introduced in a 1999 revision of the IPCC procedures, are tasked with ensuring that “all substantive expert and government review comments are afforded appropriate consideration”.³⁴ This serves to minimize the risk that lead authors, who are required “to take account of expert and government review comments when revising text”, might not adequately reflect such comments.

The core peer-review process of draft reports takes place in two stages. First, the draft report are circulated to: specialists who have significant publications in the relevant area; experts nominated by governments as coordinating lead authors, lead authors, contributing authors or expert reviewers included in the lists maintained by the IPCC Secretariat; and expert reviewers nominated by appropriate organizations.³⁵ In practice drafts are therefore widely circulated, including to international scientific organizations and intergovernmental organizations, as well industry and lobby groups. Second, the revised draft report is distributed to governments, coordinating lead authors, lead authors and contributing authors and experts. A final draft report

³¹ *Id.* at 232.

³² *Id.* at 233.

³³ See *Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports*, *supra* note 27, Annex 2.

³⁴ *Id.* Annex 1.

³⁵ *Id.*

is then prepared taking into account government and expert comments for submission to a Session of Working Group for acceptance. After the reports of the three Working Groups have been accepted by their respective plenary sessions, the entire IPCC assessment is then approved at a full IPCC plenary session. Nonetheless, some have faulted the IPCC for the quality of its peer review process.³⁶

Assessment reports consist of two parts: the scientific and technical analysis, usually written in fairly dense prose, and the much less technical Summary for Policymakers (SPM). This summary is intended to be policy-neutral and more accessible document outlining the key points contained in the underlying report.³⁷ The two different types of outputs are subject to different formal levels of endorsement. Thus, in the last part of the review process, IPCC reports are accepted at a Session of the relevant Working Group, where all member countries are represented. Acceptance means that the material has not been subject to a line-by-line discussion and agreement, but that it nevertheless presents a comprehensive, objective and balanced view of the subject matter. By contrast, the Summaries for Policymakers are subject to line-by-line approval by government representatives in plenary sessions of the Panel. It is here that governments negotiate over every word in an arduous process.³⁸ This is not surprising, given the fact that it is the summaries that are usually quoted and referred to in the media, especially those emanating from Working Group I, on the science. This leads to the question whether the politics distorts the science.

2.3 Evaluation of the IPCC

The point has been made that international environmental agreements are distinguished from most other types of international agreements in their reliance on science and technology.³⁹ Scientific findings have played a key role in identifying and defining the existence of transboundary environmental issues, as well as outlining options for mitigation and protection of the environment. The use of scientific advice and monitoring has a long history in international law.⁴⁰

³⁶ See BOEHMER-CHRISTIANSEN & KELLOW, *supra* note 10, at 141-143. The authors criticize the IPCC for what they views as the close involvement of the chapter authors in the process and the absence of a disinterested editor. Given the double layer of the full IPCC review process and the inclusion of Review Editors, these criticisms seem misplaced.

³⁷ Aside from Assessment Reports, the other materials are Synthesis, Special Reports and Methodology Reports, with the former two also being accompanied by a separate Summary for Policymakers.

³⁸ For a view on the 2007 Fourth Assessment Report, see Andrew C. Revkin, *Melding Science and Diplomacy to Run a Global Climate Review*, N.Y. Times, February 6, 2007.

³⁹ Sheila Jasanoff, *Contingent Knowledge: Implications for Implementation and Compliance*, in ENGAGING COUNTRIES: STRENGTHENING COMPLIANCE WITH INTERNATIONAL ENVIRONMENTAL ACCORDS, 63 (Edith Brown Weiss and Harold K. Jacobson, eds., 1998).

⁴⁰ See e.g., LEE A. KIMBALL, *TREATY IMPLEMENTATION: SCIENCE AND TECHNICAL ADVICE ENTERS A NEW STAGE* (1996). She cites as early examples of international scientific bodies the International Council for the Exploration of the Sea, established in 1902 to promote marine observations in the North Atlantic. She also notes that the 1946 International Convention for the Regulation of Whaling appears to be the first to explicitly link the collection and analysis of data to the management of whale fisheries and the first also to require that conservation measures “shall be based on scientific findings”.

The IPCC may be regarded against the backdrop of the increased implications of science in policymaking. This trend has for some time been well advanced at the national level in liberal democratic states, as seen in public debates around risks from toxics and environmental regulation in general. At the international level, the inter-linkage between science and policymaking reached a new level with the negotiation of the Montreal protocol.⁴¹ With greater reliance on the output of scientific expert bodies, the working methods and procedures have become increasingly formalized, with application of stricter legal procedures; the IPCC has, as examined above, adopted formal peer review procedures.

Compared to other bodies the IPCC has been remarkably successful, even as the area of work it is concerned with has become politically contentious. As an assessment body that aims to periodically take stock of the latest science, it has consciously steered clear of overtly presenting policy prescriptions. Early in its life, and before the negotiation of the United Nations Framework Convention on Climate Change (UNFCCC), it was thought by some that the IPCC would be the forum for the negotiation of a future climate treaty. The perception existed that the IPCC was a vehicle for the interests of the industrialized countries. As a consequence the developing countries acted through the General Assembly to establish the Intergovernmental Negotiating Committee (INC).⁴²

The IPCC has also proved adept at anticipating and responding to the needs of various constituencies. For instance, as noted previously, after being criticized initially for not contributing in a timely fashion to the needs of the Intergovernmental Negotiating Committee (INC) - the body that negotiated the Framework Convention - the IPCC rapidly adapted and has produced various special reports at the request of the parties to the Convention. A further innovation has been the development of Technical Papers, which draw on existing material from assessment reports. Recently, the IPCC has also begun to respond to requests from the Convention on Bio-Diversity and the Desertification Conventions.⁴³ In this respect, the current procedure is that the Panel considers requests from multilateral environmental treaties on a case-by-case basis. In its later reports the IPCC also has broadened its scope to cover not just the scientific causes and effects of climate change, but also economic and social impacts.⁴⁴ A genuine attempt has been made to take a multi-disciplinary approach to investigate climate change, as evidenced by the use of cross-cutting themes such as sustainable development. In this respect, the relative paucity of social science research on climate change and its impacts remains a concern.

Efforts also have been made to enhance the diversity of the panel by ensuring balanced representation from Northern and Southern countries, which is

⁴¹ RICHARD ELLIOT BENEDICK, *OZONE DIPLOMACY* 7 (1991).

⁴² Bodansky, *supra* note 4.

⁴³ See e.g., *BIODIVERSITY AND CLIMATE CHANGE, IPCC TECHNICAL PAPER V* (Habiba Gitay, Robert Watson, Avelino Suarez, & David Jon Dokken, eds., 2002). This report was produced in response to a request from the Subsidiary Body for Scientific, Technical and Technological Advice of the Convention on Biological Diversity. For more on formal interaction between IPCC and MEAs, see discussion of SBSTA below.

⁴⁴ NATIONAL ACADEMY OF SCIENCES, *KNOWLEDGE AND DIPLOMACY: SCIENCE ADVICE IN THE UNITED NATIONS SYSTEM* 41 (2002).

critical to the acceptance by the developing countries of the work of the IPCC. After early experiences with the framing of the climate change debate, developing countries are keenly aware of how important it is to participate to the full extent possible in a body such as the IPCC.⁴⁵ It has been pointed out that reliance on peer-reviewed literature potentially discriminates against scientific input from countries whose scientists do not have the opportunity to have their research published in the peer-reviewed journals.⁴⁶

2.3.1 Criticism of the IPCC – the skeptics

Producing assessments on the science of climate change is a contentious matter. A range of skeptics has sought to discredit global warming and has also attacked the IPCC.⁴⁷ It has been asserted that the IPCC is dominated by scientists who have an interest in climate change being identified as problem in order from them to secure government grants.⁴⁸ It is known that some skeptics have been funded by the fossil fuel industry or groups associated with them.⁴⁹ While skeptics frequently complain that their views are ignored, they have made skilful use of the media, exploiting the media's practice of seeking to achieve balance by presenting "both sides of the story". A well-known study of the peer-reviewed literature on climate change found that of almost 1000 articles none disputed the consensus view of human-induced climate change.⁵⁰ Although some objectors continue to question the underlying the science – for instance by positing alternative explanations, such as the discredited "sun spot" activity thesis – this position has become increasingly untenable, so the focus is shifting to the cost of mitigation measures, which are described as wasteful and unnecessary. With a few exceptions, skeptics have not been able to formulate consistent hypotheses, as demanded by orthodox science.⁵¹ For their part, climate scientists refute the charge that skeptics have not been given a chance to be heard, pointing out that a number of scientists with varying degrees of

⁴⁵ See FRANK BIERMANN, SCIENCE AS POWER IN INTERNATIONAL NEGOTIATIONS: GLOBAL ENVIRONMENTAL ASSESSMENTS BETWEEN NORTH AND SOUTH 2-3 (ENRP Discussion Paper 2000-17, Belfer Center for Science and International Affairs, 2000).

⁴⁶ NATIONAL ACADEMY OF SCIENCES, *supra* note 44, at 41.

⁴⁷ A well-documented attack on the IPCC is the criticism by Frederick Seitz, in 1996, of the peer review process relating to the Second Assessment Report. *See* above note 26. Other prominent skeptics include S. Fred Singer an engineer and physicist with distinguished background in academic and government service, who in 1997 published a book entitled HOT TALK, COLD SCIENCE: GLOBAL WARMING'S UNFINISHED DEBATE; Patrick Michaels, frequent commentator and author of MELTDOWN: THE PREDICTABLE DISTORTION OF GLOBAL WARMING BY SCIENTISTS, POLITICIANS AND THE MEDIA (2004) and THE SATANIC GASES (2000).

⁴⁸ BOEHMER CHRISTIANSEN & KELLOW, *supra* note 10, at 149-175.

⁴⁹ For details of the relationships between skeptics and industry-funded lobby groups, *see* ROSS GELSPAN, THE HEAT IS ON (1998) and JEREMY K. LEGGETT, THE CARBON WAR: GLOBAL WARMING THE THE END OF THE OIL ERA (2001).

⁵⁰ Naomi Oreskes, *Beyond the Ivory Tower: The Scientific Consensus on Climate Change*, 306 (5702) SCIENCE 1686 (2004).

⁵¹ Richard Lindzen, a professor at MIT and a member of the National Academy of Sciences, is one prominent critic. He has argues that water vapor causes negative rather than positive feedbacks, resulting in reduced warming. His theories are regarded as difficult to prove and flawed by most other climate scientists. *See* Daniel Grossman, *Researchers: Lindzen's Work is Flawed, Dissent in the Maelstrom*, SCIENTIFIC AMERICAN, November 2001.

skepticism have served, and continue to serve, on the panels of the IPCC.⁵² Furthermore, although some skeptics have distinguished scientific pedigrees, most do not possess backgrounds in disciplines commonly regarded as falling within the climate sciences.⁵³

With each successive IPCC report there is less room to attack the broad conclusions concerning anthropogenic climate change. Perhaps in response, skeptics seem to have turned to criticizing particular conclusions, with a recent example being the controversy around the so-called “hockey-stick” graph by Mann et al in the Third Assessment Report.⁵⁴ Based on “proxy” data (tree-rings, corals) from the past thousand years, together with the more recent instrumental record, the graph showed the rapid rise in temperature in the 20th century compared to the preceding thousand years. Such skirmishing, while making a media impact and finding support in political circles, does not really affect the broad consensus on the causes of climate change.⁵⁵

2.3.2 Methodological shortcomings?

Future climate change depends largely on human activity, in particular population growth, socio-economic development, and technological change.⁵⁶ For climate modeling purposes, such driving forces are captured using scenarios. In 2000 the IPCC released its Special Report on Emissions Scenarios (SRES), which contains 40 scenarios depicting plausible different futures up to 2100. These scenarios serve as the “inputs” for modeling exercises used by the IPCC projections, including the 2007 Fourth Assessment Report. An aspect of the methodology used in the scenarios has come under attack on economic and statistical grounds.⁵⁷ The essence of the argument advanced is that the team preparing the SRES erred in the method it used compare to compare gross domestic product (GDP) values across different

⁵² E.g. Lindzen has served on the IPCC for the Third Assessment Report. Yuri Israel, the long-serving vice-Chair of WG I, is known to question the point of the Kyoto Protocol and has expressed skepticism about the link between human activities and warming. See Mark MacKinnon, *Russian cools on Kyoto, science is questioned*, GLOBE & MAIL, October 3, 2003.

⁵³ For example Frederick Seitz, a physicist and past president of the National Academy of Sciences, has been a longstanding skeptic of theory of human-induced greenhouse warming.

⁵⁴ Michael Mann et al, *Global-Scale Temperature Patterns and Climate Forcing Over the Past Six Centuries*, 392 NATURE, 779-787 (1998). For criticism, see Stephen McIntyre & Ross McKittrick, *Corrections to the Mann et al (1998) Proxy Data Base and Northern Hemisphere Average Temperature Series*, 14(6) ENERGY AND ENVIRONMENT 751-772 (2003). The controversy has resulted in Congressional hearings, defenses and rebuttals in the media and an ongoing debate on various weblogs. At the request of Congress, the National Research Council produced a report, which appears to side with Dr. Mann. See COMMITTEE ON SURFACE TEMPERATURE RECONSTRUCTIONS FOR THE LAST 2,000 YEARS, NATIONAL RESEARCH COUNCIL, SURFACE TEMPERATURE RECONSTRUCTIONS FOR THE LAST 2,000 YEARS (2006)

⁵⁵ A well known example of extreme public skepticism is Senator James M. Inhofe, who in a speech on the Senate floor declared “global warming the greatest hoax every perpetrated on the American people”. Congressional Record – Senate, S10022, July 28, 2003.

⁵⁶ IPCC, SPECIAL REPORT ON EMISSIONS SCENARIOS 3 (2000)

⁵⁷ See Ian Castles & David Henderson, *The IPCC Emission Scenarios: An Economic-Statistical Critique*, 14 (2-3) ENERGY & ENVIRONMENT 159 (2003); Ian Castles and David Henderson, *Economics, Emissions Scenarios and the Work of the IPCC*, 14 (4) ENERGY & ENVIRONMENT, 415 (2003). The critique by Castles and Henderson garnered mainstream coverage. See article, *Hot Potato*, THE ECONOMIST, Feb. 13, 2003.

countries.⁵⁸ It was argued that the method adopted exaggerates the difference in income between developed and developing countries. That, coupled with the assumption – generally accepted as valid by economists – that income levels between developed and developing countries will converge over the next century, results in the scenarios projecting unrealistic gains in income by developing countries. This in turn would lead to unrealistically high GHG emission increases, suggesting that the IPCC warming projections are also too high. Members of the IPCC team have publicly defended the methodology used for the SRES⁵⁹ And while it appears that on strict methodological grounds there may be something to the critique, it does not follow that using a different method would have any significant effect on the average warming temperature projected by the IPCC.⁶⁰ In its latest report, the IPCC makes use of both exchange rate measures for Gross Domestic Product (GDP), stating that “[a]vailable studies indicate that the choice of exchange rate for GDP (MER or PPP) does not appreciably affect the projected emissions, when used consistently.”⁶¹

Although the dispute related to narrow and technical issue – assumptions concerning the calculation of future economic growth – it nonetheless underscores that peer review may not guard against errors when “peers are all drawn from the same restricted professional milieu”.⁶² This is especially the case where modeling exercises rely on assumptions that require validation from disciplines – such as economics and economic statistics – that lie outside the orbit of climatology or energy and climate modeling. This may present a larger challenge to the IPCC, especially as increasingly assesses the adaptive capacity of social and economic systems. This episode reinforces the commitment to an open process and a healthy regard for the limits of peer review.

2.3.3 Science – but not without politics

True to its mandate, the IPCC provides policy relevant assessments, not policy advice as such. Its assessments have enormous influence, and are accepted by

⁵⁸ The IPCC converted GDP figures into 1990 US dollars using exchange rates. The method advocated by Castles and Henderson is purchasing power parity (PPP) approach, which is an indexing method widely used for income comparison over time. Using international exchange rates can exaggerate real income differences by a factor of 5.

⁵⁹ N. Nakicenovic et al, *IPCC SRES revisited: a response*, 14 (2-3) ENERGY & ENVIRONMENT 187 (2003).

⁶⁰ Some recalculations have apparently yielded only a 0.5 degree difference, see Alan Manne & Richard Richels, *Market Exchange Rates or Purchasing Power Parity: Does the Choice Make a Difference to the Climate Debate?* (Unpublished paper, 2003, copy on file with author). See also along similar lines, RICHARD S.J. TOL, EXCHANGE RATES AND CLIMATE CHANGE: AN APPLICATION OF FUND (Working Paper FNU-45, 2004), available at <http://www.uni-hamburg.de/Wiss/FB/15/Sustainability/pppmerwp.pdf>. Because GDP growth has been overestimated, so have the potential improvements in efficiency from lowering the energy intensity (economic output per unit of energy). The two effects – lower than expected emissions (due to less economic output) and fewer efficiency gains (less improvements in energy intensity) – cancel each other out. See Bjart J. Holtmark & Knut H. Alfsen, *PPP-correction of the IPCC emission scenarios – does it matter?* 68 (1-2) CLIMATIC CHANGE 11 (2005).

⁶¹ IPCC, CLIMATE CHANGE 2007: MITIGATION, CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 8 (Bert Metz et al eds., 2007). 8 (2007), footnote omitted.

⁶² David Henderson, *Text used in making a presentation to the IPCC TGCIA Expert Meeting*, Amsterdam, 10 January 2003, available at <http://www.economist.com/media/text/efhpdoc2.pdf>.

most scientists and governments as authoritative. However, its conclusions have been disputed and its working methods attacked by a small group of skeptics, as well as interest groups linked to the fossil fuel industry.⁶³ In this politicized atmosphere, it is not surprising that a former Executive Secretary of the Secretariat of the UNFCCC has stated that: “The science has driven the politics...if the science is to continue guiding the politics, it is essential to keep the politics out of the science”.⁶⁴ It is easy to sympathize with this plea. However, one must ask whether an institution - more precisely an *intergovernmental* panel with membership includes countries with such divergent interests with respect to climate change as Antigua and Barbuda, China, the European Union, Saudi Arabia and the United States – can realistically steer clear of politics. Its summary reports are subject to line-by-line negotiations by government lawyers. Government representatives elect the Chair of the Panel, as well as the scientists who head up the Working Groups. Quite simply, the IPCC operates in political environment.

There is a general conception of science as neutral territory apart from politics, which is consistent with a model of decision-making that characterizes science as a source of objective knowledge for informing and rationalizing policy choices.⁶⁵ A more recent strand of research on science and technology conceives of them as being “socially embedded” – that is, science and technology are social institutions, influenced by context.⁶⁶ Such conceptions are particularly relevant for understanding and analysing the IPCC. Although the IPCC is engaged in producing assessments and not prescriptions, it is situated at the interface between science and politics. The fact that governments elect the membership of the Working Groups makes this almost inevitable.⁶⁷ Some scholars of science, skeptical of a clear divide between the production of scientific knowledge on the one hand, and policy on the other, have referred to the “coproduction” to explain the mutual evolution of science and politics.⁶⁸ The term refers to the ways in which knowledge, including scientific knowledge, is “framed, collected, and disseminated through social interaction” and how such knowledge in turn also impacts on social change.⁶⁹ Importantly, acknowledging the social influence on science does not entail an inevitable descent into relativism and devaluation of the basic precepts of the natural sciences.

⁶³ See also *supra* text accompanying notes 47 to 55.

⁶⁴ Michael Zammit Cutajar, quoted in TIM FORSYTH, *CRITICAL POLITICAL ECOLOGY: THE POLITICS OF ENVIRONMENTAL SCIENCE* 1 (2003).

⁶⁵ Jasanoff, *supra* note 39, at 64.

⁶⁶ *Id.* at 65.

⁶⁷ Witness the controversy in 2002, when Dr. Rajendra K. Pachauri was elected as Chairman, replacing Dr. Robert T. Watson, when it was implied that the incoming Bush administration opposed the re-election of Watson, an American, and favored Pachauri, an Indian, in the belief that the latter was more pro-industry. See Andrew C. Revkin, *Dispute Arises Over a Push to Change Climate Panel*, N.Y. TIMES, April 2, 2002.

⁶⁸ Sheila Jasanoff, *Beyond Epistemology: Relativism and Engagement in the Politics of Science*, 26(2) SOCIAL STUDIES OF SCIENCE 393, 397 (1996). See also SHEILA JASANOFF, *THE FIFTH BRANCH: SCIENCE ADVISERS AS POLICYMAKERS* (1990).

⁶⁹ FORSYTH, *supra* note 64, at 104.

The IPCC has been characterized as a “hybrid science-policy” body.⁷⁰ One implication is that framing of issues and questions and the standards of inclusion and legitimization of knowledge are not undertaken exclusively along scientific lines. As noted earlier, the setting of the work programme for assessment reports is subject to government approval, with a number of opportunities to influence the topics selected.⁷¹ The IPCC also fits the description of a boundary organization. Boundary organizations can be defined as: “social organizations or collectives that sit in two different worlds such as science and policy, and can be accessed equally by members of each world without losing identity.”⁷² Among the characteristics of boundary organizations are that they involve participation of actors from both sides of the boundary, they produce “boundary objects” (items or material that can be used by both sides without losing its identity, such as assessment reports can be and are put to different uses by scientists and policymakers), and they operate on the border between science and politics, but are accountable to both.⁷³ A successful boundary organization may be able to achieve the objectives of two quite different constituencies and at the same time remain organizationally stable while continually being engaged in negotiating the boundary between the two constituencies.⁷⁴

As an institution it has managed to maintain credibility in relation to two very different constituencies: the scientists making up its core membership and the global policy community.⁷⁵ Independent self-governance, more specifically peer review, has proved critical in maintaining the credibility of the IPCC. Thus the IPCC has managed to dynamically straddle the junction between science and politics. On the one hand producing syntheses of the latest science that are a balanced reflection of the latest scientific knowledge, and on the other producing summaries for policymakers (SPMs) that satisfy divergent views of member governments and remain consistent with the science. There is little doubt that this process does entail compromises; however, the very involvement and final imprimatur of governments gives the IPCC reports credibility among governments.

2.4. Links with the UNFCCC – the role and function of the SBSTA

The IPCC is mandated to perform periodic assessments of the state of scientific knowledge of climate change. It pre-dates the UNFCCC and its Kyoto Protocol, and it does not function as a dedicated scientific assessment body for either of these legal instruments. Nonetheless, linkages with the treaty regime have developed, one example being the production of Special Reports at the request of the Conference of the Parties. The objective of this section is to briefly examine the institutional links between the IPCC and the climate change regime in the form of the Subsidiary Body for Scientific and Technological Advice (SBSTA).

⁷⁰ Edwards & Schneider, *supra* note 26, at 225.

⁷¹ The structure of the reports has achieved a degree of stability, which may itself influence to some degree not only the presentation but also selection of material.

⁷² FORSYTH, *supra* note 64, at 141.

⁷³ *Id.* at 141.

⁷⁴ David Guston, *Boundary organizations in environmental policy and science: an introduction*, 26(4) SCIENCE, TECHNOLOGY AND HUMAN VALUES 339, 400-401 (2001).

⁷⁵ Edwards & Schneider, *supra* note 26, at 225.

The SBSTA, and its sister body, the Subsidiary Body for Implementation (SBI), are established under the UNFCCC. The role of the SBSTA, set out in Article 9, is to provide scientific and technological input into the decision-making process of the Conference of the Parties to the Convention (COP). It is mandated to assess the state of scientific knowledge with regard to climate change, the effects of measures to implement the Convention, and respond to scientific, technological, and methodological questions that the COP may put to it. Participation is open to all parties to the UNFCCC and observers from other States, international organizations and non-governmental organizations. For its part, the SBI has an advisory role in connection with the review of national communications from the parties, the effect of measures agreed by the parties, technology transfer and the adequacy of commitments.⁷⁶ In general, discussions in this body tend to be less technical and more focused on issues relating to implementation.

Article 9 of the UNFCCC does not explicitly mention the IPCC, simply stating that the SBSTA will carry out its work “drawing upon existing competent international bodies”.⁷⁷ At the time of the negotiation of the Convention, developing countries rejected efforts by the European Union countries and the United States to bring the IPCC into its structure, with the SBSTA being a compromise to manage the perceived need for expertise and relations with “competent international bodies”.⁷⁸ In contrast, the text of the Kyoto Protocol sets out more explicitly the link with the IPCC and also assigns a number of tasks to the SBSTA. Among other things, the SBSTA is mandated to: provide advice to supreme body of the Protocol, the Conference of the Parties serving as the Meeting of the Parties (COP/MOP), on modalities, rules and guidelines governing the inclusion of sinks in the parties inventories (Article 3.4); provide advice to the COP/MOP on the revision of methodologies and adjustments for estimating anthropogenic emissions of greenhouse gases (GHGs), based on the work of the IPCC (Article 5.2); and to provide advice to the COP/MOP on the revision of global warming potentials of GHGs (Article 5.3).

The first Conference of the Parties to the Convention, characterized the role of the SBSTA as “the link between the scientific, technical and technological assessments and the information provided by the competent international bodies, and the policy-oriented needs of the Conference of the Parties”.⁷⁹ The COP re-stated, in more detail, the mandate of the SBSTA as provided under Article 9 of the Convention.⁸⁰ With regard to scientific assessments the SBSTA is requested to make

⁷⁶ Bodansky, *supra* note 4, at 536-537; SEBASTIAN OBERTHUR & HERMANN E. OTT, THE KYOTO PROTOCOL: INTERNATIONAL CLIMATE POLICY FOR THE 21ST CENTURY 250 (1999).

⁷⁷ UNFCCC, art. 9(2). The only reference to the IPCC in the Convention is found in art. 21(2), which provides that the interim secretariat will cooperate closely with the Panel to ensure that it can respond to the need for objective scientific and technical advice. The reservations of developing countries concerning the IPCC were apparently responsible for the lack of more extensive references to the Panel.

⁷⁸ Clark A. Miller, *Challenges in the Application of Science to Global Affairs: Contingency, Trust, and Moral Order*, in CHANGING THE ATMOSPHERE: EXPERT KNOWLEDGE AND ENVIRONMENTAL GOVERNANCE 255-256 (Clark A. Miller and Paul N. Edwards, eds., 2001).

⁷⁹ Decision 6/CP.1, in *Report of the Conference of the Parties on its First Session*, Addendum, Part II: Action taken by the parties, prmb. para. 4, FCCC/CP/1995/7/Add.1 (1996).

⁸⁰ *Id.* decision 6/CP.1, at paras. 1-5.

use of information provided by “competent bodies”, including the IPCC. The COP “invite[ed] relevant international organizations and bodies, including the Intergovernmental Panel on Climate Change, to contribute to the work of the Subsidiary Body for Scientific and Technological Advice, especially on the scientific aspects of methodologies, particularly those relating to inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer, global warming potentials of those greenhouse gases, vulnerability assessment and adaptation, projections of emissions by sources and removals by sinks, the evaluation of the effects of measures undertaken pursuant to the provisions of the Convention and the allocation and control of emissions from international bunker fuels.”⁸¹ Based on the decisions of the COP, the SBSTA developed a list of items on which the IPCC could provide advice and requested it to carry out activities in this regard.⁸² The SBSTA has also requested the preparation of Technical Papers – reports prepared at relatively short notice – from by the IPCC.⁸³ Beginning with its 1995 Second Assessment Report, the IPCC has submitted its assessment reports to the SBSTA, where they are discussed.⁸⁴ Cooperation between the bodies exists also under Joint Working Group of Officers of the Convention and the IPCC, which brings together the members of the Bureaux of the SBSTA and IPCC, as well as the secretariat of the IPCC, and UNFCCC and deals with the working arrangements between the two bodies.⁸⁵

The questions of methodologies for the accounting of GHG emissions and sinks have remained a key area of focus for the SBSTA, where it has worked closely with the IPCC. As regards accounting for emissions from bunker fuels for international air travel and maritime travel, which are not currently covered under the Kyoto Protocol, the SBSTA has cooperated with the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). In the area of technical advice on technology transfer, a subject of major concern to developing countries, the SBSTA has carried out its activities fairly independently of the IPCC.⁸⁶ Following initial discussion, the role of the IPCC as the provider of scientific assessments on climate change to the UNFCCC has not been challenged. An early attempt to establish Technical Advisory Panels (TAPs) under the SBSTA

⁸¹ Decision 4/CP.1, in *Report of the Conference of the Parties on its First Session*, Addendum, Part II: Action taken by the parties, para. 2, FCCC/CP/1995/7/Add.1 (1996). Close cooperation with the IPCC is also foreseen in relation to the development and improvement of comparable methodologies for, among others, national inventories of emissions and removals of greenhouse gases. See decision 6/CP.1, *supra* note 79, at para. 5(a)

⁸² A preliminary list of items is contained in *Report of the Subsidiary Body for Scientific and Technological Advice on the Work of its First Session*, annex, UN Doc. FCCC/SBSTA/1995/3. At its second meeting the SBSTA requested the IPCC to carry out a detailed list of activities, see *Report of the Subsidiary Body for Scientific and Technological Advice on the Work of its Second Session*, annex III, FCCC/SBSTA/1996/8.

⁸³ See for example IPCC, IMPLICATIONS OF PROPOSED CO₂ EMISSIONS LIMITATIONS, IPCC TECHNICAL PAPER (John T. Houghton et al eds., 1997). The practice in such cases is for the IPCC to consider a request from the SBSTA, or relevant body of another convention.

⁸⁴ *Report of the Subsidiary Body for Scientific and Technological Advice on the Work of its Second Session*, *supra* note 82 at paras. 27-31.

⁸⁵ See Miller, *supra* note 78, at 260; *id.* at paras. 39 and 44.

⁸⁶ Miller, *supra* note 78, at 260.

founded on lack of consensus regarding the precise mandate and composition of the panels.⁸⁷

2.4.1 Assessment of the SBSTA

A scholar of science and policy has stated that: “Although its formal function within the [climate change] regime was initially uncertain, the SBSTA has subsequently emerged as the principal forum in which regime participants have articulated and negotiated among competing models of the institutional design for providing expert advice about climate change.”⁸⁸ The SBSTA can be regarded as a liaison and interface between the science-driven process of the IPCC and the more political COP.⁸⁹ Its success must be judged on this basis, bearing in mind that, as described above, the IPCC process is not without politics of its own.

The SBSTA is therefore perhaps more of a policy than a science body. For one thing, it is generally the same representatives who sit in the SBSTA as follow the other aspects of the climate negotiations and these, outside the large delegations fielded by some developed countries, are generally not scientists or technical experts.⁹⁰ It may thus be more accurate view the SBSTA as a body where aspects of climate change science – methodologies for greenhouse gas inventories, for instance – are discussed and integrated into the negotiating process, specifically through the preparation of draft decisions for the Conferences of the Parties (COPs). This role can be further illustrated with reference to the above-mentioned methodologies. Under Article 7(d) of the Convention the COP is charged with the development and periodic refinement of methodologies for the preparation of inventories of greenhouse gas emissions by sources and removals by sinks. In practice, the IPCC has developed these methodologies, which the COP has then approved for use by parties for reporting under the UNFCCC.⁹¹ Since the Convention states that parties should use “comparable” – not identical – methodologies, it is open to parties to

⁸⁷ *Id.* at 257. See also *Report of the First Meeting of the Subsidiary Bodies of the UN Framework Convention on Climate Change: 28 August – 1 September 1995*, 12(23) EARTH NEGOTIATIONS BULLETIN, available at www.iisd.ca. Decision 6/CP.1, *supra* note 79, at para. 3, authorized the SBSTA to establish two technical advisory panels.

⁸⁸ Miller, *supra* note 78, at 251.

⁸⁹ Bodansky, *supra* note 4, at 536. For a detailed and interesting study of the SBSTA in the context of international environmental governance and the nexus between science and policy-making, see Miller, *supra* note 78 and Clark A. Miller, *Hybrid Management: Boundary Organizations, Science Policy, and Environmental Governance in the Climate Regime*, 26(4) SCIENCE, TECHNOLOGY AND HUMAN VALUES, 478 (2001).

⁹⁰ Personal communication from Mohammed Reza Salamat, former climate negotiator for the Islamic Republic of Iran, on file with the author.

⁹¹ See decision 4/CP.1, in *Report of the Conference of the Parties on its First Session, Addendum, Part II: Action taken by the parties*, para. 1(a) and (b), FCCC/CP/1995/7/Add.1 (1996), providing, respectively, that Guidelines for National Greenhouse Gas Inventories and Technical Guidelines for Assessing Climate Change Impacts and Adaptations adopted by the IPCC should be used by Annex 1 parties for preparing their national communications. In addition, Guidelines or the simplified default methodologies developed by the IPCC should be used, as appropriate and to the extent possible, by non-Annex 1 parties in meeting their obligations under the Convention. See also decisions 9/CP.9 and 10/CP.10, in *Report of the Conference of the Parties on its Ninth Session, Addendum, Part II: Action taken by the parties*, FCCC/CP/2003/6/Add.1 (2004), providing, respectively, for revised reporting guidelines for Annex 1 parties, and for the guidelines for the submission of initial communications by non-Annex 1 parties.

select alternatives. This is recognized in the decisions of the COP, which state that parties “should” use the methodologies developed by the IPCC, but that it is open to parties to use their own, provided that they are sufficiently substantiated.⁹² The “intermediary” role of the SBSTA is illustrated in its decision recommending when and how parties should adopt the revised IPCC methodology guidelines for greenhouse gas inventories. In that case, it was decided that the guidelines should be phased in for Annex 1 parties, while non-Annex 1 countries were “encouraged” to apply them.⁹³

Another example of the SBSTA’s function as an intermediary between the UNFCCC and the IPCC relates to the estimation of emissions of a new class of greenhouse gases - the so-called fluorinated gases - which find important uses as alternatives to ozone-depleting substances.⁹⁴ In this case the IPCC provided two methodologies for reporting emissions of these gases,⁹⁵ each having different implications in terms of data requirements and accuracy over time. The SBSTA decided to encourage countries to use the method that although more accurate on a year-to-year basis, could also be regarded as masking the full impact on greenhouse gas concentrations of the continued use of these substances.⁹⁶ This methodological

⁹² See decision 4/CP.1, in *Report of the Conference of the Parties on its First Session*, Addendum, Part II: Action taken by the parties, para. 1, UN Doc. FCCC/CP/1995/7/Add.1 (1996).

⁹³ *Report of the Subsidiary Body for Scientific and Technological Advice on the Work of its Fourth Session*, para. 30, FCCC/SBSTA/1996/20.

⁹⁴ HFCs and PFCs are alternatives to ozone-depleting substances and are not controlled under the Montreal Protocol on Substances that Deplete the Ozone Layer. Their use is expected to grow in the future, with applications in refrigeration and air-conditioning, fire suppression, aerosol sprays, solvent cleaning and foam blowing. The chemicals have high global warming potentials (hundreds and even thousands of times more powerful than carbon dioxide). Some have long atmospheric residence times. Another substance, SF₆, is used in gas insulation switchgear, circuit-breakers, fire suppression and other applications.

⁹⁵ The REVISED 1996 GUIDELINES indicate that emissions of HFCs, PFCs and SF₆ can be estimated using either of two approaches, namely, a *potential* emission approach or an *actual* emission approach. See REVISED 1996 IPCC GUIDELINES FOR NATIONAL GREENHOUSE GAS INVENTORIES, VOL. 3, GREENHOUSE GAS INVENTORY REFERENCE MANUAL 46 (John T. Houghton et al eds., 1996). Accessible at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>, last checked 28 May 2007. The potential approach uses annual data on production, exports, imports and destruction, which are generally available to most countries. The emission estimates so derived tend to be high because they do not take into consideration storage in equipment and the slow release of the chemicals over time. Over a period of 15-30 years, as products are retired and gases escape into the atmosphere, actual emissions come into line with the estimates. This approach to reporting has been adopted under the Montreal Protocol. The *actual* approach attempts to take into account the time lag between consumption and emissions. The time lag occurs because chemicals used in new equipment tend to leak out over time, more specifically during manufacturing, operation and disposal. This approach provides low estimates in the early years. It tends to mask the possible long-term implications of chemicals accumulating in equipment and products. The SBSTA encouraged countries to adopt the actual approach, while also requiring them to provide estimates of potential emissions for purposes of comparability. See UN Doc. FCCC/SBSTA/1996/20.

⁹⁶ *Report of the Subsidiary Body for Scientific and Technological Advice on the Work of its Fourth Session*, *supra* note 93, at para. 31 and endorsed in decision 2/CP.3, in *Report of the Conference of the Parties on its Third Session*, Addendum, Part II: Action taken by the parties, UN Doc. FCCC/CP/1997/7/Add.1 (1998). The reason for the “actual” method masking the cumulative impact of emissions is that it estimated annual emissions from the products concerned, such as foams and refrigerants, occurring over a period of 15-20 years.

choice was not a purely scientific and technological one, but rather akin to that faced by a regulator faced with the need weigh up factors such as effectiveness and available resources. This is typical of the role that the SBSTA is able to play as the link between the scientific assessment process of the SBSTA and the implementation-focussed activities of the Convention and Kyoto mechanisms.

Other methodology issues that the SBSTA has dealt with include methodologies to account for emissions from bunker fuels for international maritime and air travel, as well as harvested wood products. In these instances the choice and application of a particular methodology depends essentially on a political decision. With respect to bunker fuels, the issue concerns the attribution of emissions where these do not take place on the territory of any party. In the case of harvested wood products, in other words furniture and so forth, the question is the attribution of the emissions from products, either by decomposition or combustion, where this occurs in a country other than that where the wood was harvested.⁹⁷ Both have been discussed in the SBSTA, so far without conclusive resolution.

The SBSTA has served as a venue where scientific outcomes have been vetted and agreement sought among the various interest groups. Progress has been slow, reflecting the lack of consensus on many of the issues, but also hampered by the rule of consensus that applies to the deliberations.. Although the early attempt to set up technological advisory panels soon foundered, SBSTA did decide that it would draw on experts from a roster for specific issues, an example being technology transfer, that are of particular concern to developing countries. During negotiating sessions the practice of convening small “contact groups” has facilitated agreement on sensitive as well as highly technical matters, bearing with it, however, the danger that small delegations lacking technical expertise may be left out of the process.

2.4.2 Other science assessment bodies under MEAs

Scientific assessment and technological advice is an important component of many multilateral environmental agreements (MEAs). Science has been instrumental in identifying the environmental problems that the agreements were created to address. Furthermore, the implementation of treaty obligations frequently requires that scientific questions be authoritatively settled within the framework of the agreement. This chapter has analyzed the role played by the IPCC and the SBSTA in the climate regime. The purpose of this part is to briefly examine science-policy bodies connected with, or operating under, a handful of other MEAs. Science advice in conventions has followed two broad models. Agreements such as Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES)⁹⁸ and the Ramsar Convention on Wetlands⁹⁹ have made use of small experts groups for scientific and technological advice, with selection on the basis of geographical representation.¹⁰⁰ Appointed panels, as further discussed below, also provide advice to the parties to the Montreal Protocol on Substances that Deplete the Ozone Layer.

⁹⁷ Miller, *supra* note 78, at 262.

⁹⁸ Convention on international trade in endangered species of wild fauna and flora, March 2, 1973, 993 U.N.T.S. 244.

⁹⁹ Convention on wetlands of international importance especially as waterfowl habitat, February 2, 1971, 996 U.N.T.S. 246.

¹⁰⁰ NATIONAL ACADEMY OF SCIENCES, *supra* note 44, at 39.

On other hand, the UNFCCC, the United Nations Convention to Combat Desertification¹⁰¹ (UNCCD) and the Convention on Biological Diversity¹⁰² (CBD) all rely on subsidiary bodies whose membership is open to all parties. As with the SBSTA under the UNFCCC, these advisory bodies operate in practice by appointing working groups or groups of experts to provide input on specific scientific and technological issues.

Scientific assessment played a key role in the adoption of the Montreal Protocol, as well as its subsequent amendments.¹⁰³ Article 6 of the Montreal Protocol provides that every four years the Parties shall assess the control measures under the Protocol on the basis of the available scientific, environmental, technical, and economic information, with panels being convened to cover the respective fields. Since 1990 the panels have been organized as follows: the Technological and Economic Panel (TEAP), the Scientific Assessment Panel (SAP), and the Environmental Effects Assessment Panel (EEAP). The latter two panels essentially evolved from the WMO/NASA ozone assessments and follow the model of selecting government and academic members, with strict reliance on publications from peer-reviewed journals.¹⁰⁴

The organization of the membership of the Technical Panel is different, drawing heavily on respected and capable experts from industry, which reflects the fact that the latest technology developments are not to be found in the peer-reviewed literature. The SAP and EEAP are organized along chapter committees to cover particular topics, while the TEAP has Technical Option Committees (TOCs) on different sectors. While the parties to the Protocol make recommendations, the chairs of the panels have had considerable freedom to select the most qualified and suitable candidates for the technical committees that draft the reports.¹⁰⁵ At the same time, an effort was made to involve experts from developing countries, with about a third of the membership of the committees being from these countries. A factor in the success of the panels under the Montreal Protocol has been their continuity. Although Article 6 originally envisaged the convening of ad hoc panels, they have in fact become standing panels and have gone beyond only assessing control measures to have a positive influence on the implementation of the Protocol.¹⁰⁶ The standing nature of the panels built a community of scientists and technologists resulted in a sharing of knowledge and expertise that positively influenced the political discussions. The TEAP, in particular, has been singled out for assembling a tight-knit network of experts who's work in translating scientific findings and technological

¹⁰¹ United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, October 14, 1994, 1954 U.N.T.S. 3, 33 I.L.M. 1238.

¹⁰² Convention on Biological Diversity, June 5, 1992, 1760 U.N.T.S. 79.

¹⁰³ BENEDICK, *supra* note 41; STEPHEN O. ANDERSEN ET AL, PROTECTING THE OZONE LAYER: THE UNITED NATIONS HISTORY 258-260 (2002).

¹⁰⁴ ANDERSEN ET AL, *supra* note 103, at 439.

¹⁰⁵ ANDERSEN ET AL, *supra* note 103, at 360.

¹⁰⁶ *Id.* at 360.

breakthroughs into real, practical suggestions played a major role in the adoption of more stringent policies.¹⁰⁷

Article 25 of the Convention on Biological Diversity establishes an intergovernmental scientific advisory body known as the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA). SBSTTA, which consists of government experts, is a subsidiary body of the Conference of the Parties (COP), to which it reports. Its functions include: providing assessments of the status of biological diversity; assessments of the effect of measures taken in accordance with the provisions of the Convention; and responding to scientific, technical, technological and methodological questions put to it by the COP and its subsidiary bodies. The COP may further elaborate the function, terms of reference and organization of the SBSTTA.¹⁰⁸ A large part of SBSTTA's work consists of preparing recommendations for the COP, which are either endorsed by the COP in whole or in part, or taken up in another form. A decision by the COP sets out the *modus operandi* for the SBSTTA, providing for the formation of ad hoc technical expert group meetings on specific priority issues on its program of work.¹⁰⁹ Guidelines have been put in place for the operation of the expert groups, including components such as the roster of experts.¹¹⁰ Discussion of the "identity crisis" of the SBSTTA – the divergence between its scientific advisory and political roles – was a feature during its early meetings.¹¹¹ It was noted that the delegates serving on the SBSTTA were frequently the same as those in the COP, and many did not have a background in science. Recently, it seems that finding the appropriate balance between science and politics has continued to be a challenge underlying the SBSTTA's work.¹¹²

One study concluded that while the Convention on Biodiversity has continued to strive to improve its science advice system, the existing structure has not allowed for a balance between scientific credibility and policy involvement.¹¹³ A higher premium has been placed on policy involvement rather than on the need to improve the scientific credibility of the reports underpinning the policy advice. Political concerns may have hampered the establishment of large assessments on key areas such as marine and coastal biodiversity, which could have been undertaken by a

¹⁰⁷ PENELOPE CANAN & NANCY REICHMAN, OZONE CONNECTIONS: EXPERT NETWORKS IN ENVIRONMENTAL GOVERNANCE, 30-32 (2002).

¹⁰⁸ Convention on Biological Diversity, *supra* note 102, art. 25(3).

¹⁰⁹ See Decision IV/16, *Modus Operandi of the Subsidiary Body on Scientific, Technical and Technological Advice*, annex 1, available at <http://www.biodiv.org>. The experts serving on the ad hoc groups are selected from a roster by the Executive Secretary of the CBD Secretariat in consultation with the Bureau of the SBSTTA. The duration and terms of reference for the groups are recommended by the SBSTTA for approval by the COP. Interestingly, as a general rule reports of expert groups should be submitted for peer review.

¹¹⁰ See *Terms of Reference for the Ad Hoc Technical Expert Groups*, Note by the Executive Secretary, Doc. UNEP/CBD/SBSTTA/4/5; *Ad Hoc Technical Expert Groups: Terms of Reference, and Roster of Experts and Uniform Proposal for Their Use*, Note by the Executive Secretary, UNEP/CBD/SBSTTA/5/15

¹¹¹ *Summary of the Second Session of the Subsidiary Body Scientific, Technical and Technological Advice of the Convention on Biological Diversity 2-6 September 1996*, 9(54) EARTH NEGOTIATIONS BULLETIN (1996), available at <http://www.iisd.ca/vol09/0954000e.html>.

¹¹² *Summary of the Ninth Meeting the Subsidiary Body Scientific, Technical and Technological Advice of the UN Convention on Biological Diversity 10-14 November 2003*, 9(262) EARTH NEGOTIATIONS BULLETIN (2003), available at <http://www.iisd.ca/download/pdf/enb09262e.pdf>.

¹¹³ NATIONAL ACADEMY OF SCIENCES, *supra* note 44, at 43.

more independent body like the IPCC. Overall, however, it appears that the SBSTTA has been less constrained by disagreements between member states than its UNFCCC counterpart, the SBSTA.

2.5 Conclusions

As the only intergovernmental institution charged with conducting assessments of the science of climate change, the IPCC finds its conclusions and processes subjected to intense scrutiny. The IPCC has institutionalized processes for validating authoritative statements of the state of knowledge with respect to the biophysical, economic and social aspects of climate change.

Despite dire warnings and mounting evidence, scientific findings and conclusions have, however, largely proven incapable of catalyzing policy responses commensurate with the threat. This suggests that a more complex model of the interaction between climate science and policy needs to be developed. At times it may appear that different scientific disciplines – natural and social – give conflicting messages. Climate scientists emphasize new findings and provide projections on risks, which often seem to call for urgent action. On the other hand, economists, concerned with aggregate welfare and efficiency, tend to counsel against precipitate action. Others champion technology as the solution, potentially making unrealistic assumptions about its adoption, barriers to entry, and intended consequences.

A well-developed scientific understanding is a necessary, but far from sufficient condition for responding to the global problem of climate change. In this respect, there can be little doubt that the IPCC has served the climate regime well. The involvement of governments in work of the IPCC, leading to charges of “politicization” from critics, contributes to the Panel’s impact: having publicly endorses its key findings, governments are less likely to deny them in the negotiation rooms or to their publics.

Chapter 3 – Development of the international climate change regime

3.1 Introduction: Framework Convention on Climate Change

By the end of the 1980s the threat of climate change had entered the policy arena. The basic scientific conclusions about the causes and dimensions of the potential human impact on the climate were sufficient to bring pressure to bear to take action at the international level.¹ Momentum had begun to build with the release of the first report of the Intergovernmental Panel on Climate Change (IPCC) and the holding of the Second World Climate Conference in Geneva in November 1990. In December of that year the United Nations General Assembly established the Intergovernmental Negotiating Committee (INC), tasked with negotiating the Convention. The INC met in five formal sessions, working within a tight deadline to complete a text for adoption before the United Nations Conference on Environment and Development (UNCED), commonly known as the Earth Summit. The text of what was called the United Nations Framework Convention on Climate Change (UNFCCC) was adopted on 9 May 1992 and opened for signature a month later at the Summit.²

According to the author of the leading commentary, the Convention proved disappointing to many.³ Efforts to include binding stabilization targets, not to mention reductions, were watered down, leaving the Convention only with vague commitments with respect to stabilization. Other shortcomings identified include failure to include an insurance fund and technology transfer mechanism (sought by the developing countries), the absence of market mechanisms such as emissions credits, and the limited obligations imposed on developing countries. Nonetheless, given the diverging interests of the parties concerned, the Convention was a remarkable achievement. It unambiguously recognizes climate change as a threat and sets the long-term objective to stabilize GHG emissions at “at a level that would prevent dangerous anthropogenic interference with the climate system”.⁴ The process of convening regular conferences of the parties (COPs) is one of the Convention’s key features, as it has led to improvements in the collection of information concerning emissions, the reduction of uncertainties and the work towards international standards. Similarly, it was soon recognized that the Convention needed to be fleshed out, leading to the negotiation of the Kyoto Protocol, under the auspices of the Conference of the Parties to the Convention, which in effect served as a preparatory committee for the Protocol. All the same, it is sobering to reflect that the same arguments made then against binding stabilization or reduction targets – namely, that scientific uncertainty and the potential impact on

¹ The evolving scientific understanding and early policy responses are covered in chapter 1. The developments prior to the Convention are comprehensively covered Daniel Bodansky, *The United Nations Framework Convention on Climate Change: A Commentary* 18 YALE J. INT. L. 451, 458-471 (1993) [hereinafter Bodansky, *Commentary*]. See also Daniel Bodansky, *Prologue to the Climate Change Convention*, in NEGOTIATING CLIMATE CHANGE: THE INSIDE STORY OF THE RIO CONVENTION 45, 46-60 (Irving L. Minzer & J Amber Leonard eds., 1994) [hereinafter Bodansky, *Prologue*]. This and the following section draw on these two sources.

² United Nations Framework Convention on Climate Change, *adopted on May 9, 1992*, art. 3(1), 1771 U.N.T.S. 164, 31 I.L.M. 851 [hereinafter UNFCCC].

³ See Bodansky, *Commentary*, *supra* note 1, at 454.

⁴ See UNFCCC, art. 2.

economic growth mean that it would be unwise to take action – still are holding back more aggressive mitigation measures today.⁵

This chapter will provide a brief account of the genesis of the Convention and an overview of its key provisions. The second part will trace the development of the Kyoto Protocol and briefly outline some of its key provisions.

3.1.1 Genesis of the Convention - Negotiating history

The international scientific effort to study climate change was taken up at the intergovernmental level with the formation of the IPCC in 1988, under the auspices of the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP).⁶ And while the discussions on an international policy response to the emerging threat of climate change were at an early stage, the United Nations General Assembly resolution endorsing the establishment of the IPCC made reference to “the identification and possible strengthening of relevant existing international legal instruments having a bearing on climate...[and] elements for inclusion in a possible future international convention on climate.”⁷ Yet this was far from a definitive call to action. The year 1989 saw support for a convention mount, with a large group of industrialized countries calling for negotiations, in the process increasing pressure on United States to change course and support such an initiative.⁸ When the United States changed its position, it was not long afterwards that the UNEP Governing Council adopted a resolution mandating UNEP to commence preparations for the negotiations. However, as momentum for a treaty grew, so too did the view that such negotiations should take place under the broader umbrella of the General Assembly, rather than the technical strictures of UNEP and the WMO, in recognition that climate change had implications beyond the environment.⁹ Developing countries had raised concerns that the IPCC process was dominated by the developed countries, whose experts were in the majority on the Panel.¹⁰

Discussions also took place on the form a convention might take, with some favoring a general framework agreement modeled on the United Nations Law of the Sea Convention, supplemented by separate protocols covering particular atmospheric issues, such as climate change and ozone depletion.¹¹ Even before the

⁵ See Richard A. Kerr, *U.S. Bites Greenhouse Bullet and Gags*, 251 *SCIENCE*, 868 (1991) and Rose Gutfeld, *Climate Change Pact is Reached by 143 Nations – Treaty Begins Initial Attack on Global Warming*, *Wall St. J.*, May 11, 1991, at A7. See more recently, Letter to Members of the Senate on the Kyoto Protocol on Climate Change, 37 *WEEKLY COMP. OF PRES. DOC.* 444 (Feb. 13, 2001), in which President Bush sets out the Administration’s position, stating that the Protocol “would cause serious harm to the U.S. economy” and referring to “the incomplete state of scientific knowledge of the causes of, and solutions to, global climate change”.

⁶ See chapter 2.

⁷ G.A. Res. 53, U.N. GAOR, 43rd Sess., U.N. Doc. A/RES/43/53 (1988).

⁸ See Bodansky, *Prologue*, *supra* note 1., at 54.

⁹ Delphine Borione & Jean Ripert, *Exercising Common but Differentiated Responsibility*, in *NEGOTIATING CLIMATE CHANGE: THE INSIDE STORY OF THE RIO CONVENTION*, 71, 81-82 (Irving L. Minzer & J. Amber Leonard eds., 1994)

¹⁰ See G.A. Res. 207, U.N. GAOR, 44th Sess., U.N. Doc. A/RES/44/207 (1989), at *prmb.* para. 9 and *op.* para. 9.

¹¹ See Bodansky, *Prologue*, *supra* note 1, at 53.

onset of formal discussions, however, the alternative approach of a dedicated framework convention climate change emerged as the preferred option.

In a resolution adopted in December 1989, the United Nations General Assembly expressed support for the initiative to begin preparations for negotiations on a framework convention on climate and called on States to “prepare, as a matter of urgency, a framework convention on climate and associated protocols containing concrete commitments in the light of priorities that may be authoritatively identified on the basis of sound scientific knowledge, and taking into account the specific development needs of developing countries”.¹² This resolution also foreshadowed some of the themes that would feature in the subsequent negotiation of the Convention and beyond, including the historical responsibility of industrialized countries for anthropogenic climate change and developing countries’ need for financial support, as well access to, and transfer of, environmentally sound technologies.¹³

General Assembly Resolution 45/212, of 21 December 1990, established the Intergovernmental Negotiating Committee (INC) and mandated it to pursue “a single intergovernmental negotiating process under the auspices of the General Assembly” tasked with negotiating a convention incorporating “appropriate commitments”.¹⁴ The INC conducted its work on five sessions, of which the first three were largely dominated by the staking out of positions and procedural discussions.¹⁵ This prelude did allow the parties to sound each other out and served to more clearly delineate the positions of the various groups. The INC struggled to develop a negotiating text - the bread and butter of intergovernmental negotiations – and its penultimate meeting concluded with a text littered with hundreds of brackets, indicating the diverging positions of the parties. In a decision widely credited with facilitating the adoption of the Convention, the Chairman of the INC presented his clean draft negotiating text for consideration at the final meeting.¹⁶

A number of determining positions stood out and were instrumental in shaping the Convention. First, throughout the negotiations the United States remained firmly opposed to binding targets for emission stabilization and reduction, which in various forms were advocated by the states of the European Community (EC). Although it favored a pared-down treaty along the lines of the Vienna Convention for the Protection of the Ozone Layer, the United States came to accept a more detailed Climate Convention. The question of targets and timetables bedeviled the process until before the very last session of the INC, just prior to which it was resolved by means of a compromise crafted by the United Kingdom and the United States, giving rise to what is now Article 4(2) of the Convention.¹⁷ Targets and timetables were replaced with language according to which industrialized countries would report regularly on policies and measures to reduce

¹² *Supra* note 10, at op. para. 12.

¹³ *See id.* prmb. para. 7 and op. paras. 14-15.

¹⁴ G.A. Res. 212, U.N. GAOR, 45th Sess., UN. Doc. A/RES/45/212 (1990).

¹⁵ *See* Bodansky, *Prologue*, *supra* note 1, at 61.

¹⁶ *See* Bodansky, *Commentary*, *supra* at 491; Ahmed Djoghla, *The Beginnings of an International Climate Law*, in NEGOTIATING CLIMATE CHANGE: THE INSIDE STORY OF THE RIO CONVENTION, *supra* note 9, at 102.

¹⁷ *See* Bodansky, *Commentary*, *supra* note 1, at 491

emissions, with the aim of returning emissions to their 1990 levels.¹⁸ Second, an issue pressed by the developing countries was that of access to financial resources and technology. These countries generally assigned less importance to climate change mitigation, given the more immediate needs demanding the attention of their governments and argued that they should receive additional financial assistance for mitigation and adaptation.

By and large the industrialized countries, quite possibly aware of the cost that mitigation efforts would exact from their economies, were unwilling to agree to either specific mitigation targets for themselves or new and additional resource flows to developing countries. Discussion centred around the role of the Global Environment Facility (GEF), with industrialized countries insisting on designating it as the funding mechanism, while developing countries argued for the creation of a dedicated financial mechanism for the Convention. As a final compromise the GEF was designated as the financial mechanism on an interim basis.¹⁹ Third, among the developing countries, who underscored the industrialized countries' historical responsibility for emissions, there was generally little support for strong commitments or mechanisms for implementation, with the exception of island and small low-lying states, which banded together under the umbrella of the Alliance of Small Island States (AOSIS). Given their particular and immediate concern with the effects of climate change, this group of states advocated positions considerably more stringent than those of most other developing countries. In fact, the G-77²⁰ had some difficulty maintaining a common negotiating position and stopped meeting as a group at the fourth session of the INC. This came as a result of the diverging interests of the states making up this group, encompassing states with very different interests such as AOSIS and the OPEC countries, some of whom made common cause with the United States in drawing attention to scientific uncertainties and the undesirability of targets and timetables.

While CO₂ is the most important greenhouse gas, making up around 77 per cent of anthropogenic emissions, the other greenhouse gases, such as methane, nitrous oxide and some of the hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), from a range of industrial and consumer uses, are also important. While they may be emitted only in relatively small quantities, because of their high global warming potentials their abatement offers significant CO₂-equivalent emission reductions. This was one reason why countries, led by the United States, argued that the Convention should adopt a "comprehensive approach" that considered all greenhouse gases and removals by sinks. The Convention refers only to "carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol", which deals with ozone depleting substances, without endorsing the comprehensive

¹⁸ UNFCCC, art. 4(2)(b).

¹⁹ See Elizabeth Dowdeswell & Richard J. Kinley, *Constructive Damage to the Status Quo in*, NEGOTIATING CLIMATE CHANGE: THE INSIDE STORY OF THE RIO CONVENTION, *supra* note 9, at 113, 124-125. A later decision confirmed the status of the GEF as the financial mechanism of the Convention.

²⁰ The Group of 77 and China, so-called for its original number of members, but today a group representing 132 developing countries in various United Nations fora, including the climate change negotiations. The chairmanship of the G-77 rotates on a six-monthly basis. For a selection of recent statements made on behalf of G-77, see <http://www.g77.org/>.

approach. However, under the Kyoto Protocol a basket of gases count towards the emission limitation and reduction targets.

3.1.2 Key provisions of the UNFCCC

The following section will outline some of the key provisions of the Convention. The objective is not to be comprehensive, but rather to select provisions that are of relevance to the issues raised in this thesis.

Bodansky concludes that the Convention falls somewhere between a framework and substantive convention, establishing more comprehensive obligations than the bare-bones form of a treaty such as the Vienna Convention on the Depletion of the Ozone Layer, yet falling short of the detailed commitments contained in the Montreal Protocol to the Vienna Convention.²¹ Functionally, the provisions of the Convention can be roughly grouped under four headings: introductory provisions, commitments and associated provisions, institutions established by the Convention, and final or “boilerplate” provisions relating to amendments, entry into force and the like. Thus, the introductory part consists of the preamble, definitions, the objective of the Convention (Article 2), and principles guiding the implementation of the Convention (Article 3). Principles listed include the principle of the protection of the climate system for the benefit of present and future generations of humankind, the principle of equity, the principle of common but differentiated responsibilities, and the precautionary principle. With respect to the latter, it is evident how carefully the provision is balanced – it affirms that lack of full scientific certainty should not be used as a reason to postponing mitigation measures; at the same time such measures must be cost-effective to ensure global benefits at the lowest possible cost. The principle of the right to sustainable development is included. The linkage between climate change and sustainable development is an important one, underpinning as it does so many debates between North and South on the conceptualization of global problems, including climate change. Considered overall, the phrasing of the principles reveals several, sometimes opposing, strands. For example, phrases emphasizing environmental integrity are linked with a reference to cost-effectiveness of measures. Similarly, mitigation measures should not come at the cost of development for the developing countries, and mitigation measures should not constitute an unjustifiable restriction on international trade.²² The legal status of the principles is difficult to define with certainty. Nonetheless, and despite efforts to dilute their legal implications, the principles stand clearly as interpretive aids to the Convention.²³

The ultimate “objective” of the Convention is clearly stated in Article 2 as “the stabilization of greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system.” This level “should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.” The recognition of the

²¹ See Bodansky, *Commentary, supra* note 1, at 496.

²² See in relation to trade, UNFCCC, art. 3(5).

²³ See Bodansky, *Commentary, supra* note 1, at 501 (noting that the United States inserted the word “guide” and replaced the word “States” with “Parties” to undercut the argument that the principles were part of customary international law binding on all parties).

need to stabilize greenhouse gas emissions underlines the serious nature of the climate change. The exact legal status of the objective is, however, not entirely clear.²⁴ While the objective is not phrased as an obligation, it can convincingly be argued that it is akin to a collective commitment, as it encapsulates the rationale of the Convention as a whole. Various stabilization targets have been proposed, based on the avoidance of major, irreversible events, and at the same time considering what is technologically and economically feasible. The objective cannot be understood as an obligation to meet any such specific target, but rather as a commitment to strive, in good faith, to stabilize greenhouse gas concentrations, including through the implementation of the Convention and subsequent protocols. In the final analysis, although the objective is explicit, it retains a Delphic quality. Who is to say precisely what constitutes “dangerous” interference with the climate system and for whom?²⁵

The principle of “common but differentiated responsibilities” finds its most explicit expression in the Convention.²⁶ The principle is not a new one in international law, finding expression in, among others, provisions of the General Agreement on Trade and Tariffs (GATT) and the United Nations Convention on the Law of the Sea (UNCLOS).²⁷ In the context of the negotiations, the principle served to bridge the positions of the developed countries, which, with the exception of the United States sought some form of targets for stabilization and reduction, and the developing countries, which generally contended that it would be unfair to them to assume such commitments.

In the Convention, the principle finds expression in the differentiation in commitments between Annex 1, or developed country parties, and non-Annex 1 parties. Differentiation exists with respect to: Annex 1 parties’ non-binding goal to return their emissions to 1990 levels by 2000; more stringent and frequent reporting obligations of Annex 1 parties; and provisions concerning the granting of assistance, which also fall within the ambit of differential treatment as articulated by the principle of common but differentiated responsibilities.²⁸ The Convention provides that a sub-set of Annex 1 parties – essentially the members of the OECD in 1992, listed in Annex II to the Convention – have a special responsibility to assist developing countries meet their commitments. Thus Article 4(3) states that parties included in Annex II “shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties” in complying with their reporting obligations. Parties included in Annex II are, among other things, also required (“shall”) to take all practicable measures to promote and finance the transfer of environmentally sound technologies, particularly to developing countries.²⁹

²⁴ See Bodansky, *Commentary*, *supra* note 1, at 500.

²⁵ For a recent scientific contribution addressing this issue, see AVOIDING DANGEROUS CLIMATE CHANGE (Hans Joachim Schellnhuber et al eds., 2006).

²⁶ See UNFCCC, art. 3(1) and art. 4(1). The principle is further analyzed in chapter 5. For a detailed analysis of the principle in the climate change regime, see LAVANYA RAJAMANI, *DIFFERENTIAL TREATMENT IN INTERNATIONAL ENVIRONMENTAL LAW* 176-249 (2006).

²⁷ Yoshiro Matsui, *Some Aspects of the Principle of “Common but Differentiated Responsibilities”*, 2 INTERNATIONAL ENVIRONMENTAL AGREEMENTS: POLITICS, LAW AND ECONOMICS, 151, 151-152 (2002).

²⁸ RAJAMANI, *supra* note 26, at 191.

²⁹ UNFCCC, art. 4(5).

The commitments contained in Article 4 form the core of the Convention, setting out obligations common to all parties, as well as those applicable only to industrialized or Annex 1 parties. In terms of Article 4(1), all parties must prepare national inventories of anthropogenic emissions by sources and removals by sinks, as well as implementing programs containing measures to mitigate climate change, as well as measures facilitate adaptation. The parties are also required to promote sustainable management, conservation and enhancement of sinks and reservoirs of greenhouse gases, including forests and oceans. Under Article 4(2), the Annex 1 parties commit themselves to adopt national policies and take corresponding measures on the mitigation of climate change, by limiting anthropogenic emissions of greenhouse gases and protecting sinks. The Annex 1 parties also are required to report periodically on the above policies undertaken by them, “with the aim of returning individually or jointly to their 1990 levels these anthropogenic emissions of carbon dioxide and other greenhouse gases”.³⁰ To the extent that this is a binding legal obligation, it is a rather weak and diluted one.³¹ As the record shows, where this obligation was met it was by and large due to economic factors and unrelated to mitigation measures.³²

Article 12 on reporting (“communication of information”) of inventories and applicable methodologies reinforces, and is closely linked to, Article 4. While all parties must communicate their inventories and describe steps taken to implement the Convention, Annex 1 countries must also include in their communications detailed descriptions of policies and measures to mitigate climate change. However, the reporting obligation is differentiated for developing countries, which shall submit their first national communication within three years of the entry into force of the Convention or of the availability of financial resources in accordance with Article 4(1). Least developed countries (LDCs), a sub-set of developing countries classified by the United Nations largely on the basis of very low per capita GDP, can submit national communications at their discretion.³³ The provision relating to reporting forms a fundamental part of the Convention as the reporting and monitoring is vital measuring progress. It also facilitates the development of common standards and builds trust among the Parties. Reporting and monitoring is a mainstay of multilateral environmental agreements, as is true of treaties in other spheres, such as human rights. And, while the Convention does not explicitly empower any of its institutions to review compliance with its provisions, the Conference of the Parties has elaborated a process of in-depth expert reviews of Annex 1 parties’ national communications.³⁴ Finally, as they serve to facilitate reporting, the provisions

³⁰ UNFCCC, art. 4(2)(b).

³¹ See Bodansky, *Commentary, supra* note 1, at 516 (expressing doubt as to whether they legally binding and calling them a “quasi-target and quasi-timetable”).

³² Primarily the economic collapse in states of the former Soviet Union and shuttering of inefficient industries in Central and Eastern Europe and the reunified Germany.

³³ UNFCCC, art. 12(5).

³⁴ See Jacob Werksman, *Compliance and the Kyoto Protocol: Building a Backbone into a Flexible Regime* 9 YEARBOOK OF INTERNATIONAL ENVIRONMENTAL LAW 48, 65-66 (Jutta Brunnée & Ellen Hay eds., 1999).

covering cooperation on research and observation and education and training should also be mentioned here.³⁵

A third key part of the Convention consists of the Articles relating to the institutional arrangements, namely the Conference of the Parties (COP) and its subsidiary organs for scientific and technological advice and implementation, as well as the financial mechanism. The Conference of the Parties, as the supreme body of the Convention, is empowered to make decisions to promote the effective implementation of the Convention, including to “[e]xercise such other functions as are required for the achievement of the objective of the Convention”.³⁶ Thus, aside from the enumerated functions, the COP is entrusted with such open-ended powers necessary to implement the Convention. It is also provided that the COP shall agree upon and adopt by consensus rules of procedure.³⁷ This stipulation had the result that parties who did not support the objectives of the Convention could block consensus on the adoption of the rules of procedure, which was the case at the first Conference of the Parties, with the result that the rules of procedure have at every meeting been “applied”, without ever having been formally been adopted. The provisions on voting, however, have never been applied.³⁸ Exponents of delay and obfuscation were thus handed a veto, because - in the absence of voting rules - the rule of consensus applies. Creative accommodation and skilful chairmanship have thus proved key to overcoming this impediment. Unfortunately, the Convention’s unhappy status quo concerning the rules of procedure was also imported into the Kyoto Protocol.³⁹

Lastly, the Convention has the standard provisions covering the settlement of disputes, amendments to the Convention, and adoption of protocols.

3.2 The Kyoto Protocol

A significant new chapter in the field of environment and energy was opened with the decision in 2004 of the Russian Federation to ratify the Kyoto Protocol. Adopted in 1997, the Protocol had existed in a state of limbo. With Russia’s ratification, the Protocol cleared its final hurdle, entering into force on 16 February 2005.⁴⁰ It builds on the United Nations Framework Convention on Climate Change, by setting binding emission targets for Annex 1 countries to limit or reduce their

³⁵ See UNFCCC, art. 5 and art. 6.

³⁶ See UNFCCC, art 7(2)(m).

³⁷ UNFCCC, art. 7(2)(k).

³⁸ Sebastian Oberthür & Hermann E. Ott, *THE KYOTO PROTOCOL: INTERNATIONAL CLIMATE POLICY FOR THE 21ST CENTURY* 40, 46 (1999). Art. 17 concerning protocols to the Convention does not specify procedures for the adoption of such instruments, which meant that parties were referred back to the rules of procedure “applied” but not “adopted”. This effectively extended the veto to the decision on the adoption of the Kyoto Protocol. For the text of the draft rules of procedure, see *Organizational matters, Adoption of the rules of procedure, Note by the secretariat*, FCCC/CP/1996/2 (1996).

³⁹ UNFCCC, art. 13(5) states that “[t]he rules of procedure of the Conference of the Parties...shall be applied mutatis mutandis under this Protocol, except as may be otherwise decided by consensus...”

⁴⁰ UNFCCC, art. 25(1) stipulates that entry into force is conditional on ratification of 55 countries and representing at least 55 per cent of CO₂ emissions in 1990, the base year for the treaty. As at 10 January 2007, 176 states had ratified or acceded to the Protocol. After Australia’s deposited its instrument of accession at the Thirteenth Conference of the Parties (COP-13) in Bali in 2007, the United States became the sole industrialized country not to have ratified the Protocol.

greenhouse gas emissions. Overall, the Annex 1 countries that have ratified the Protocol are required to reduce their emissions by 5.2 per cent relative to 1990 emissions. Parties must meet their targets at the end of the commitment period, from 2008 to 2012.

The Protocol contains a number of innovations. It breaks new ground at the international level by assigning a key role to three “flexibility mechanisms”. In terms of institutional design, the mechanism for monitoring and enforcing compliance is unique among multilateral environmental agreements. To a significant degree, the Protocol itself consists of an outline, so that considerable time and effort was required to finalize the “rulebook” necessary to implement its provisions. That process is essentially complete. Under provisions for a “prompt start”, key aspects of the Protocol, such as the clean development mechanism (CDM), began to operate before its entry into force.

As indicated, a key innovation of the Protocol is the establishment of the so-called “flexibility mechanisms”, which consist of emissions trading between Annex 1 countries, joint implementation between developed countries, and the clean development mechanism (CDM), which links carbon reduction efforts with developing countries by making it possible to earn credits for projects implemented in developing countries. Importantly, the CDM is not designed solely to accomplish carbon reductions, but is also intended to help developing countries achieve sustainable development. The market in credits from CDM projects is gaining momentum, and indications are that it could be a significant source of capital investment, perhaps in the order of 12 billion dollars by 2012.⁴¹ The value of credits traded under the CDM in 2006 totalled an estimated US\$ 5 billion.⁴² Linking the CDM to regional emission trading systems, as has been done with the European Emissions Trading Scheme, will also serve to bolster the CDM market. The international carbon market is still in an early stage of development, but is growing rapidly – and is expected to increase dramatically in coming years. The driving force behind such flexibility mechanisms is the disparity of emission control costs in different parts of the world. Based on current analyses, for example, the marginal costs of control for greenhouse gases within developing countries is approximately half that found within OECD. Studies demonstrate that developed countries could significantly reduce the cost of meeting their greenhouse gas reduction goals by making use of the flexibility mechanisms.⁴³ In the case of the CDM, developing

⁴¹ This figure assumes a price per ton of CO₂ of around US\$ 10 and CDM credit volumes of about 1.2 billion certified emission reductions (CERs). See United Nations Framework Convention on Climate Change Secretariat, Press Release, *Annual green investment flow of some 100 billion dollars possible as part of fight against global warming*, 19 September 2006, http://unfccc.int/files/press/news_room/press_releases_and_advisories/application/pdf/20060919_riyadh_press_release_vs5.pdf. For analysis of CDM volumes, INTERNATIONAL EMISSIONS TRADING ASSOCIATION, 2006 STATE OF THE CDM: IETA POSITION ON THE CDM FOR COP-12/MOP-2, 43-44 (2006).

⁴² KARAN CAPOOR & PHILIPPE AMBROSI, WORLD BANK, STATE AND TRENDS OF THE CARBON MARKET 2007 3 (2007).

⁴³ Economic modeling strongly suggests that marginal abatement costs are significantly lower if global trading is instituted. See a comparison of the results of two dozen models by Urs Springer, *The market for tradable GHG permits under the Kyoto Protocol: a survey of model studies*, 25(3) ENERGY ECONOMICS 527 (2003).

countries should also benefit from increased investment and clean energy technologies.

Reducing greenhouse gases will require the implementation of effective policies and the diffusion of climate-friendly technologies. Emissions from the industrialized countries, which stabilized in the 1990s, are once again rising.⁴⁴ At the same time, emissions from developing countries, especially emerging economies, are rising very rapidly. This underlines the need to fully implement the Kyoto Protocol – a first step in the collective effort to combat climate change – while also elaborating a more stringent and inclusive successor agreement. The next part of this chapter consists of a brief account of the Protocol’s negotiating history.

3.2.1 Negotiating history

The Protocol is the result of more than two years of preparatory negotiations, culminating in a down-to-the-wire final negotiating session.⁴⁵ The seeds for the Protocol were sown by the Convention. Thus Convention Article 4(2) provides that the Conference of the Parties shall at its first meeting review the adequacy of the “aim” to return greenhouse gases to 1990 levels by the year 2000 and to consider next steps. Projections indicated that it was very unlikely that Annex 1 parties were going to meet that goal.⁴⁶ It was also evident that commitments with a horizon of 2000 were not sufficient to combat climate change in a meaningful manner. Given the work of the IPCC, policymakers were also cognizant that a stabilization of emissions at 1990 levels would be insufficient to stabilize greenhouse gas concentrations. Thus when the first Conference of the Parties (COP-1) met in Berlin in April 1995, there was a realization that further commitments would be required, a conclusion that was strongly opposed by oil producing exporting countries and some powerful interest groups, such as US industrial lobby.⁴⁷ Nonetheless, at COP-1 parties reached an agreement coined the Berlin Mandate, which set in motion a process to reinforce the Convention’s commitments by means of a protocol or other instrument, with objective of elaborating policies and measures and setting quantified limitation and reduction objectives (“targets”) within specified post-2000 timeframes.⁴⁸

Developing countries contended that, in accordance with the principle of common but differentiated responsibilities the process leading to a new instrument should not introduce any fresh commitments for them. Industrialized countries’ (reluctant) acceptance of this position was an important factor in reaching agreement and in shaping the instrument that emerged from the negotiations. (In the explicit

⁴⁴ *Compilation and Synthesis of Third National Communications*, U.N. Doc. UNFCCC/SBI/7/Add.1 (2003).

⁴⁵ Two well-known books on the Kyoto Protocol are: Sebastian Oberthür & Hermann E. Ott, *THE KYOTO PROTOCOL: INTERNATIONAL CLIMATE POLICY FOR THE 21ST CENTURY* (1999) [hereinafter Oberthür & Ott, *INTERNATIONAL CLIMATE POLICY*]; Michael Grubb et al, *THE KYOTO PROTOCOL: A GUIDE AND ASSESSMENT* (1999) [hereinafter Grubb et al, *GUIDE AND ASSESSMENT*].

⁴⁶ *First Review of Information Communicated by Each Party Included in Annex 1 to the Convention*, U.N. Doc. A/AC.237/81, (1994).

⁴⁷ See Grubb et al, *GUIDE AND ASSESSMENT*, *supra* note 45, at 46.

⁴⁸ Decision 1/CP.1, in *Report of the Parties to the Convention on its First Session*, Addendum, Part II: Action taken by the parties, FCCC/CP/1995/7/Add.1 (1995). For details on the Berlin Mandate and the AGBM, see Grubb et al, *GUIDE AND ASSESSMENT*, *supra* note 45, at 43-60; Oberthür & Ott, *INTERNATIONAL CLIMATE POLICY*, *supra* note 45, at 43-54.

exclusion of commitments for developing countries lay seeds of the fateful US Senates' Byrd-Hagel resolution, which by a vote of 97-0 rejected Senate ratification of any agreement not contemplating commitments for developing countries.) It was also decided that should be completed in 1997 with a view to adopting the results at the third session of the Conference of the Parties. Following the Berlin meeting, a negotiating body, known as the *Ad hoc* Group on the Berlin Mandate (AGBM), was established to oversee the negotiation of the new instrument. The AGBM met eight times between 1995 and 1997 and produced a compilation text in time for the third Conference of the Parties (COP-3) in Kyoto.

Countries participate in the climate change negotiations as members of one or other grouping.⁴⁹ The largest, and the oldest, is the Group of 77 or G-77, which today counts 132 developing countries as members.⁵⁰ China is an associate member and works closely with the Group, so that statements are usually made "on behalf of the G-77 and China". It is active throughout the United Nations system, and the country holding the six-month presidency of the Group usually appoints individuals as spokespersons on a particular issue, or for certain negotiating sessions. Given the diverse interests housed within the Group - encompassing OPEC oil exporting countries and small island states - coordinating a common position often proves difficult. Accordingly, sometimes certain developing countries will pursue their interests through smaller groups, such as the Alliance of Small Island States (AOSIS), a grouping of 43 low-lying and island countries and the group of Least Developed Countries (LDCs). AOSIS was formed during the negotiations on the Framework Convention. The member states of the European Union (EU) negotiate as a bloc, led by the country holding the rotating six-month presidency. The Umbrella Group is a loosely organized and brings together non-EU industrialized countries, usually Australia, Canada, Iceland, Japan, New Zealand, Norway, the Russian Federation, Ukraine and the United States. The Umbrella Group evolved out of the JUSSCANNZ coalition (Japan, United States, Switzerland, Canada, Australia, Norway and New Zealand), which became active during the Kyoto Protocol negotiations at COP-3. The Umbrella Group countries share an interest in advocating for cost-effectiveness and flexibility in the development and implementation of the climate regime. A fairly new grouping is the Environmental Integrity Group, consisting of Mexico, the Republic of Korea, and Switzerland.

The key issues in the negotiating process – the *Ad Hoc* Group on the Berlin Mandate - that would culminate in the Kyoto Protocol can be grouped under three broad headings: (i) specific policies and measures that might be included; (ii) targets, or "quantified emissions limitations and reduction objectives" (QELROs), in the negotiating jargon; and (iii) developing country concerns relating to financial support and technology transfer.⁵¹ At the instigation of the European Union, the Berlin

⁴⁹ The UNFCCC secretariat has a useful note on the various groupings on its website at: http://unfccc.int/parties_and_observers/parties/negotiating_groups/items/2714.php. More details on the party groups and their negotiating positions and influence can be found in FARHANA YAMIN & JOANNA DEPLEDGE, *THE INTERNATIONAL CLIMATE REGIME: A GUIDE TO RULES, INSTITUTIONS AND PROCEDURES*, 34-46 (2005).

⁵⁰ At its founding in 1964, in the context of the United Nations Conference on Trade and Development (UNCTAD), the Group had a membership of 77 countries. Membership grew in the following decades as more countries attained independence and joined the United Nations.

⁵¹ See Grubb et al, *GUIDE AND ASSESSMENT*, *supra* note 45, at 62.

Mandate committed the parties to elaborate policies and measures for mitigating climate change, ranging from energy efficiency appliance labeling through to carbon taxes. After internal wrangling, the EU submitted a list of policies and measures, some of which were intended to be mandatory, but this “command and control” regulatory approach was rejected by the United States, which preferred to retain flexibility with respect to choice of mitigation mechanisms.⁵² The EU proposals did not garner much support, with the OPEC states especially emphatic to exclude carbon taxes. A turning point came at the second Conference of the Parties (COP-2), when the United States spoke out in favor of binding emission reductions, taking the wind out of the sails of EU’s arguments for mandatory policies and measures. The watered-down version of the EU proposals – contained in Protocol Article 2 – in no way reflects time expended on this item during the earlier phase of the negotiations. A few years later, in an audacious policy about-face, the EU embraced binding targets and market mechanisms, establishing a EU-wide emissions trading scheme in 2005, while the US retreated from the mechanisms that it had once championed.

COP-2 was held in Geneva in early July 1996. The IPCC’s Second Assessment Report (SAR), officially published in June, concluded: “The balance of evidence suggests that there is a discernible human influence on global climate.” The Geneva Ministerial Declaration endorsed the SAR and stated that it should provide a scientific basis for strengthening action, particularly action by Annex I Parties to limit and reduce emissions of greenhouse gases. The Declaration also noted several findings of the SAR, including that achieving a stabilization of atmospheric GHG concentrations at twice pre-industrial levels would eventually require global emissions to fall below half of 1995 levels. The Geneva Conference also saw an about-turn by the United States, which changed the dynamic of the negotiations when it announced support for legally binding commitments. With this it became clear that despite some lingering objections, binding commitments would be a feature of whatever instrument eventually was adopted.⁵³ From the perspective of the present, it is somewhat surprising that, until well into the AGBM process, it was uncertain whether the emission targets would be legally binding or framed as “soft” target similar to those in the Convention.⁵⁴

The next part provides an overview of the key provisions of the Protocol. For practical purposes, the section focuses on analyzing the most relevant provisions, providing details of the negotiations where relevant.

3.2.2 Key provisions

The basic structure of the Protocol may be summarized briefly as follows.⁵⁵ The substantive obligations of industrialized (Annex 1) countries are set out in Article 2 (policies and measures), Article 3 (emission target and timetable), Article 4 (joint fulfillment by a group of Parties), Article 5 (inventories and methodologies), and Article 7 (reporting). Article 10 largely restates the Convention provisions on

⁵² For more details, see Oberthür & Ott, *INTERNATIONAL CLIMATE POLICY*, *supra* note 45, at 103-106.

⁵³ See Grubb et al, *GUIDE AND ASSESSMENT*, *supra* note 45, 53-55.

⁵⁴ See Oberthür & Ott, *INTERNATIONAL CLIMATE POLICY*, *supra* note 45, at 49.

⁵⁵ Kyoto Protocol to the United Nations Framework Convention on Climate Change, December 11, 1997, 37 I.L.M. 22, text available from the website of the UNFCCC secretariat, http://unfccc.int/kyoto_protocol/items/2830.php [hereinafter Protocol].

cooperation and national communications. Article 11 essentially repeats Convention Articles 4(3) and 11, providing guidance to Annex II Parties on financing for developing countries to carry out their inventory and reporting obligations. The institutional role of the Conference of the Parties to the Convention, the Secretariat, the subsidiary bodies and related matters are dealt with in Articles 9, 13, 14, 15 and 16. The market-based mechanisms designed to assist Annex 1 parties in meeting their obligations to reduce greenhouse gas emissions are covered in Article 6, Article 12, and Article 17. Article 18 requires the development of compliance procedures and mechanisms. Article 19 makes the dispute resolution provisions of the Convention applicable to the Protocol. The legal boilerplate relating to matters such as amendment, entry into force and so forth is covered in Articles 20-28.

The preamble and definitions sections of the Protocol are short, drawing on what is contained in the Convention. The definition of “parties present and voting” as a Party present and casting an affirmative or negative vote – typically found in the rules of procedure – was included as a result of an anomalous situation under the Protocol. The parties to the Convention have never formally adopted the Rules of Procedure and the provision on voting is not applied.⁵⁶ Article 13(5) provides that the same rules applied under the Convention will be applicable to the Protocol until such time as otherwise decided by consensus. As indicated this effectively incorporates the unsatisfactory state of affairs existing under the Convention, meaning that decisions under the Protocol are subject to consensus.⁵⁷

Article 2(1) sets out a menu of policies and measures to be adopted by Annex 1 countries, which are phrased in non-binding terms, qualified (“in accordance with its national circumstances”). The policies covered include enhancement of energy efficiency, protection and enhancement of sinks and reservoirs, development of renewable forms of energy, and reduction or phasing out of market imperfections and subsidies that run counter to the objectives of the Convention.⁵⁸

Article 2(2) calls on Annex 1 Parties to pursue the limitation or reduction of greenhouse gas emissions from aviation and marine bunker fuels, working through the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), which are the international organizations that deal with these sectors. International bunker fuel emissions were not included in Annex 1 parties Kyoto targets, largely because no agreement could be reached on how to ascribe responsibility for such emissions.⁵⁹ Accordingly, while parties must tally these emissions, they are excluded from national totals and are reported separately. The issue continues to be on the agenda of the SBSTA, which has discussed matters related to improving the monitoring and accuracy of emissions international bunker

⁵⁶ The reason is that the impasse on the rules of procedure, and the consequent absence of a provision on voting, means that decisions have to be taken by consensus, a state of affairs that gives objectors a veto. In practice, at crucial times, chairmen have managed to carry majority decisions over the objections of a few States.

⁵⁷ See Oberthür & Ott, *INTERNATIONAL CLIMATE POLICY*, *supra* note 45, at 100.

⁵⁸ See UNFCCC, art. 2(1)(a).

⁵⁹ See Oberthür & Ott, *INTERNATIONAL CLIMATE POLICY*, *supra* note 45, 107-108.

fuels, as well as liaising with ICAO and IMO.⁶⁰ For their part, these organizations have been studying the issue, but have not moved towards control measures.⁶¹

Driven by growth in air travel and international trade rapid, both aviation and maritime emissions are rising rapidly, so that regulation under future international climate policy will be important.⁶² Emissions from CO₂ rose about 68 per cent between 1990 and 2000.⁶³ In addition, various factors amplify the effect of emissions from air travel: a special report of the IPCC on aviation noted that while aviation was responsible for about 2 per cent of CO₂ emissions from human activities, it accounted for an estimated 3.5 per cent of climate change.⁶⁴ Given the lack of substitutes for aviation and marine bunkers, efficiency improvements are the focus in both transport sectors. With respect to aviation, the IPCC has estimated that fuel burn could be reduced by 6-18 percent with better operating measures, particularly air traffic control.

The agreement on binding quantified emissions targets and a timetable for their achievement represent the heart of the Kyoto Protocol. Under Article 3 Annex 1 Parties as a group committed themselves to individual and differentiated emission targets, which they would have to meet with a view to reducing their overall emissions of the applicable greenhouse gases by at least 5 per cent below 1990 levels. The individual targets, relative to the 1990 baseline, are inscribed in Annex B to the Protocol. During the negotiations various targets were proposed, some for specific gases, but the introduction of differentiated targets helped to bridge the existing differences. While the EU advocated an early date for meeting targets should be met – 2005 was proposed – the United States insisted on 2010. The rump of the EU proposal is to be found in Article 3(2), which provides that each Annex 1 Party should by 2005 have made “demonstrable progress in achieving its commitments”.

⁶⁰ See *Methodological issues relating to emissions from international aviation and maritime transport*, Note by the Secretariat, FCCC/SBSTA/2004/INF.5 (2004).

⁶¹ The 36th ICAO Assembly established a group to develop a program of action on climate change and international aviation, but parties could not agree on a proposal to endorse emissions trading. The resolution adopted provides that emissions trading schemes should only be implemented with mutual consent of the States concerned. See *Consolidated statement of continuing ICAO policies and practices related to environmental protection*, Ass. Res. A36-22 (2007), appendixes K and L, compiled in *Resolutions adopted at the 36th Assembly, Provisional Edition* (Sept. 2007). At the regional level the European Commission has proposed bringing aviation, including flights into and out of the European Union, under EU Emissions Trading Scheme. See Commission of the European Communities, Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community, COM(2006) 818, 20 December 2006. Despite opposition for airlines, it seems that the EU Governments will adopt an amended version of the proposal, see James Kanter, *Plan on Emissions Hints at U.S.-Europe Rift*, N.Y. TIMES, December 21, 2007.

⁶² MICHEL DEN ELZEN ET AL, AN ANALYSIS OF OPTIONS FOR INCLUDING INTERNATIONAL AVIATION AND MARINE EMISSIONS IN A POST-2012 CLIMATE MITIGATION REGIME 13 (Netherlands Environment Agency Report, MNP Report 500114007/2007, 2007).

⁶³ IPCC, CLIMATE CHANGE 2007: MITIGATION, CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 330 (Bert Metz et al eds., 2007).

⁶⁴ IPCC SPECIAL REPORT, AVIATION AND THE GLOBAL ATMOSPHERE, 6, 8 (Joyce E. Penne, et al, eds., 1999).

The genesis of the targets and timetables can usefully be analyzed by examining how the emission targets are defined, the level of the commitments, and the flexibility mechanisms designed to aid in achieving them.⁶⁵ Given the prospect of allocation of the mitigation burden under a post-2012 climate regime, it is interesting to note that apparently it was never questioned that targets would be formulated with reference to, and largely on the basis of, historical emissions. Alternatives, such as indices calculating emissions relative to population or GDP did not make it further than academic journals.⁶⁶ Other key issues concerned which sources (gases) would be covered and how to account for sinks (forests). With respect to sources, negotiators opted for a so-called “basket of gases” or comprehensive approach that, in addition to the three greenhouse gases – carbon dioxide, methane and nitrous oxide - includes three trace gases that have very powerful warming effect and whose emission levels have been rising rapidly.

The Protocol defined and put into practice the comprehensive approach to greenhouse gases previously adopted in the Convention. The basket of gases approach introduces a degree of “what” flexibility, because Parties can select the gas or gases on which to concentrate their mitigation activities, enabling them to choose the most cost-effective options. To make reductions of the various gases comparable, negotiators turned to the global warming potentials (GWPs) that the IPCC had developed for the various greenhouse gases. The GWP expresses the greenhouse forcing effect of a gas relative to CO₂. Using the GWPs, collective emissions of the applicable greenhouse gases can be calculated as CO₂ equivalent emissions, which is the term used in Article 3 of the Protocol.⁶⁷ Table 3.1 illustrates the respective GWPs of the greenhouse gases controlled under the Kyoto Protocol, as well as their main sources.

⁶⁵ See Grubb et al, GUIDE AND ASSESSMENT, *supra* note 45, at 62 and following. The next section draws heavily on his work.

⁶⁶ See *id.* at 77.

⁶⁷ Although the GWPs are a convenient tool, questions have been raised concerning their scientific soundness and accuracy. See Grubb et al, GUIDE AND ASSESSMENT, *supra* note 45, at 74 (referring to academic criticisms that GWPs are “uncertain and logically imperfect”).

Table 3.1: Greenhouse gases in Kyoto Protocol

Gas	Sources	Emission trends 1990-2000	Lifetime (years)	GWP-100 years	% GHG Annex 1, 2000
Carbon Dioxide (CO ₂)	Fossil fuel burning, cement	Small decrease (<1%), mainly due to reduction in EIT countries, significant increases in some EU and OECD	Variable, depending on uptake by sinks, but dominant component up to 100	1	82 %
Methane (CH ₄)	Rice, cattle, biomass burning, land conversion, fossil fuel production	21 % decline, increases in a few countries	8.4/12	23	10 %
Nitrous Oxide (N ₂ O)	Fertilizers, fossil fuel burning, land conversion for agriculture	5% decrease due to sharp drop in EITs	120/114	296	6 %
Perfluoro-carbons (PFCs)	Industry, aluminum, electronic and electrical industries, fire fighting, solvents	Decreased	10000 to >50000	5700 (CF ₄); 11900 (C ₂ F ₆)	0.30 %
Hydrofluoro-carbons (HFCs)	Industry, refrigerants	Sharp increase due to substitution for ODS controlled by Montreal Protocol	1.40 to 260	120 (HFC-152a); 1200 (HFC-23)	1.23 %
Sulphur hexafluoride (SF ₆)	Electronic and electrical industries, insulation	Decreased	3200	22000	0.38 %

Source: Adapted from *IPCC, Climate Change 2001: Working Group 1: The Scientific Basis*, Table 4.1(a) and *Compilation and Synthesis of Third National Communications*, U.N. Doc. UNFCCC/SBI/7/Add.1 (2003)

The technically very complicated issue of sinks came to prominence quite late in the negotiations.⁶⁸ Up to half of the carbon emitted from human sources is quite rapidly absorbed by terrestrial sources (plants) and the oceans through the

⁶⁸ See Oberthür & Ott, *INTERNATIONAL CLIMATE POLICY*, *supra* note 45, at 130.

operation of the natural carbon cycle.⁶⁹ Countries with significant forests stood to gain if absorption by sinks were to be counted against CO₂ emissions (the so-called “net” approach emissions approach). The subject became controversial, not least because counting sinks (forests) appeared to be postponing actual cuts in emissions and seemed to favor some countries over others. While it was agreed that parties should not be able to count natural sinks (existing forests) this begged the question of what constituted an anthropogenic sink.⁷⁰ The approach eventually adopted counts “[t]he net changes in greenhouse gas emissions by sources and removals by sinks resulting from *direct human-induced* land-use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990” (own emphasis).⁷¹ This definition left a number of questions open and the adoption of detailed implementation rules proved difficult and time-consuming.⁷²

The Protocol contains several “flexibility mechanisms” to help Parties meet their obligations at lowest cost. Legally, support for such flexibility can be found in the Convention. Article 3(3) states that policies and measures “should be cost-effective so as to ensure global benefits at the lowest possible cost” and “be comprehensive, cover all relevant sources... and comprise all economic sectors.” It also provides that efforts to address climate change may be carried out cooperatively by interested Parties. Article 4(2)(a) states that Annex 1 Parties may implement policies and measures jointly with other Parties and cooperate to achieve the objective of the Convention, and Article 4(2)(d) provides that the Conference of the Parties shall decide on criteria for joint implementation.

Foremost of the measures allowing for flexibility are the market-based mechanisms elaborated in Articles 6 (joint implementation), Article 12 (clean development mechanism), and Article 17 (international emissions trading). Before discussing these mechanisms in greater detail, it is worth considering their common features and the context in which they operate. Regulated parties are subject to a

⁶⁹ The storage capacity on land and in the oceans is clearly not unlimited. While considerable uncertainties remain, indications are that the oceans absorb about half of anthropogenic carbon. As warming increases, the physical uptake of this carbon is expected to decrease. See Christopher L. Sabine et al., *The Oceanic Sink for Anthropogenic CO₂* 305 (5682) SCIENCE 367 (2004). In addition, higher levels of CO₂ have also been linked with acidification of the oceans, with yet uncertain consequences for organisms and ecosystems, but it is thought that corals and components of phytoplankton may be affected. See THE ROYAL SOCIETY, POLICY DOC. 12/05, OCEAN ACIDIFICATION DUE TO INCREASING ATMOSPHERIC CARBON DIOXIDE (2005).

⁷⁰ It is frequently pointed out that since natural forests are carbon sinks, there ought to be a way to link their protection and preservation to the generation of carbon offset credits. In general, one problem with carbon offsets for avoided deforestation is that alternative land uses, commonly logging or soybean farming, are currently economically more attractive. Within the climate regime, countries with large areas of tropical rainforest that are experiencing significant deforestation (and resultant emissions), have traditionally resisted discussions of any measures or policies relating to preserving forests as natural sinks. This has changed, however, in the past few years with Indonesia, for instance, joining other smaller tropical rainforest countries expressing interest in market incentives for reduced deforestation. Costa Rica has pioneered the concept of ecosystem services. Forestry Law No. 7575 adopted in 1996, recognizes four services provided by Costa Rica’s forests: carbon sequestration, hydrological services, biodiversity protection, and scenic beauty.

⁷¹ Protocol, art. 3(3).

⁷² Decision 19/CP.9, in *Report of the Conference of the Parties on its Ninth Session*, addendum, Part II: action taken by the parties, vol. 2, FCCC/CP/2003/6/Add.2 (2004). See section 3.3 below, summarizing the outcomes of COP-9.

limitation on their emissions (the “cap”) over a given period of time. (Under the Protocol this is the 2008-2012 commitment period.). The potential for emissions reductions varies from country to country and industry to industry. That is to say, the marginal cost of abatement varies. Setting a cap on emissions puts a price on carbon. Depending on the carbon price, firms may engage in mitigation activities—installing more efficient machinery or switching from coal to natural gas for power generation. Other - facing relatively high abatement costs – may find it cheaper to purchase emissions allowances. The carbon price acts as an incentive for firms to seek out the least-cost mitigation opportunities, with the result that the overall mitigation effort takes place in the most efficient manner. For this reason, economists prefer “market-based” instruments over “command-and-control” regulatory policies, such as design or performance standards, which it is argued result in economic losses.⁷³ The experience in the United States with the 1990 amendments to the Clean Air Act,⁷⁴ resulted in reductions of sulfur dioxide at much lower cost than had been predicted, providing a major boost to the proponents of trading mechanisms.⁷⁵ A larger and more diverse market – with more mitigation opportunities – leads to lower aggregate mitigation costs, so that on economic efficiency grounds larger emission trading markets (national or international) are preferable to small ones.⁷⁶

Theoretically, taxes can achieve the same results as a trading scheme, with the same or lower aggregate costs.⁷⁷ In fact, economic theory suggests that taxes are

⁷³ Robert N. Stavins, *What Can We Learn from the Grand Policy Experiment? Lessons from SO₂ Allowance Trading*, 12(3) THE JOURNAL OF ECONOMIC PERSPECTIVES, 69, 69 (1998). Interestingly, Stavins also summarizes reasons why legislators, regulators and industry favored a command-and-control approach.

⁷⁴ Clean Air Act of 1970 42 U.S.C. S § 761b (2003).

⁷⁵ The savings are generally estimated to have been about \$1 billion (in 1996 dollars) per year. However, the calculation of savings is sensitive to assumptions about alternative regulatory options. See CURTIS CARLSON ET AL, SULFUR DIOXIDE CONTROL BY ELECTRIC UTILITIES: WHAT ARE THE GAINS FROM TRADE? 3-5 (Resources for the Future, Discussion Paper 98-44-REV, 2000). According to Office of Management and Budget calculations, for the period 1992 to 1995 the benefits of the Title IV SO₂ trading provisions exceeded the costs 40:1. See OFFICE OF MANAGEMENT AND BUDGET, DRAFT 2003 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS, 68 Fed. Reg. 5492, 5500.

⁷⁶ Economic studies confirm that global trading, as opposed to domestic action, lowers the cost of meeting commitments under the Kyoto Protocol. See John P. Weyant & Jennifer Hill, *Introduction and Overview* THE COSTS OF THE KYOTO PROTOCOL: A MULTI-MODEL EVALUATION, SPECIAL ISSUE OF THE ENERGY JOURNAL vii, (John P. Weyant ed., 1999). This is one reason why the private sector may prefer a federal cap-and-trade system in the United States, as opposed to a number of overlapping but separate state schemes, for instance the planned California initiative.

⁷⁷ Economic analysis suggests that price (tax) measures are more suited than permit or trading (quantity) approaches to certain environmental problems. In particular, price measures are more efficient in situations where harmful consequences of the pollution (externality) are a function of a much larger stock accumulating in the environment, rather than an annual flow. The lack of a definite, short-term threshold for severe damage also favors a tax approach. This is the case for ozone depleting substances, groundwater pollution and the accumulation of greenhouse gases in the atmosphere. In the case of climate change, because the problem is caused by the total concentration of GHGs, the marginal benefit of reducing a unit of emissions is rather low. In the terminology of economics, the marginal benefits curve is flat relative to the marginal cost of abatement, and hence prices are preferred on efficiency grounds. See RICHARD G. NEWELL & WILLIAM A. PIZER, REGULATING STOCK EXTERNALITIES UNDER UNCERTAINTY, 1-2 (Resources for the Future

more appropriate for addressing climate change, where what counts is not achieving a particular level of pollutants year-to-year – as in the case of air pollution – but ensuring a change in the long-term trend. In practice, however, carbon taxes have, with the exception of a few European countries, proved politically unpalatable.

For their part, regulated industries may prefer emissions trading, in part because such a scheme creates a tradable asset, as opposed to a tax that extracts revenue.⁷⁸ If emissions allowances or permits are allocated at no cost – that is, “grandfathered” as opposed to auctioned – some firms will extract a benefit or economic “rent”. In the case of a tax, revenue is channeled to the government, which in theory can recycle it by adjusting other taxes to address distortions in the tax system and fund other desirable activities like worker re-training in emissions intensive industries research on clean energy technologies.⁷⁹ Functioning emissions trading markets require careful design and a sophisticated regulatory framework, as demonstrated by the performance of the European Emissions Trading Scheme (EU ETS) in 2006, when information showing that many firms had benefited from an over allocation of allowances, which resulted in a dramatic drop in prices.⁸⁰ Availability of full information – actual historical emissions, monitoring of emissions, and realistic calculations of expected growth – are critical for the regulator. Given weak regulatory frameworks, as well as uncertainty about emissions growth projections, cap-and-trade schemes are generally not regarded as a good policy option for any but the most sophisticated developing countries.

Market-based mechanisms of the Kyoto Protocol introduce flexibility in several respects. First, and very importantly, three trading mechanism – CDM, JI and international emissions trading – provide flexibility regarding the location where emissions reductions can be undertaken.⁸¹ Second, the comprehensive approach, discussed above, introduces flexibility as to which greenhouse gases count. Third, the provision of a five-year commitment period (2008-2012) allows some leeway regarding when the commitment must be met. In addition, countries with economies in transition, in other words the countries of Eastern Europe and the former Soviet

Discussion Paper 99-10-REV, 2000). The classic analysis on the merits of prices versus quantities is M.L. Weitzman, *Prices vs. Quantities* 41(4) REVIEW OF ECONOMIC STUDIES, 477-491 (1974).

⁷⁸ See Grubb et al, GUIDE AND ASSESSMENT, *supra* note 45, at 90. The “political economy” of trading schemes is covered by Stavins, *supra* note 73, at 74-76 (1998). Since permits are almost always freely allocated (grandfathered) regulated industries are able to extract an economic rent. In addition, free initial allocation serves as a barrier to entry for new firms, who would have to purchase permits. For legislators, a permit scheme with a free allocation has the advantage of masking the cost of regulation, unlike a tax. For more on this, see Nathaniel O. Keohane et al, *The Choice of Regulatory Instruments in Environmental Policy*, 22 HARVARD ENVIRONMENTAL LAW REVIEW 313-367 (1998).

⁷⁹ See for instance the “ecological tax” reforms in Germany that aim to reduce the tax burden on labor and shift a portion of it to environmental consumption. E.g. Mineral Oil Tax Law of 21 December 1992, as amended (*Mineralölsteuergesetz* vom 21 Dezember 1992).

⁸⁰ After it became known in April 2006 that firms in several member states held considerably more allowances than actual emissions of the covered installations, the price of EU allowances (EUAs) almost halved in price. While regulated entities may have an interest to inflate their emissions projections, the integrity of a trading scheme demands that the regulator have access to real emissions data.

⁸¹ See for discussion of various types of flexibility, Jim Skea, *Flexibility, Emissions Trading and the Kyoto Protocol*, in POLLUTION FOR SALE; EMISSIONS TRADING AND JOINT IMPLEMENTATION (Steve Sorrell & Jim Skea, eds., 1999).

Union, were granted flexibility in choosing their baselines.⁸² Lastly, Article 4 of the Protocol allows groups of countries members of a regional integration organization to fulfill their obligations jointly under a “bubble arrangement”.⁸³ The European Union assumed an overall reduction commitment of 8 per cent below 1990 levels, which was then divided into individual targets for the 15 member states that jointly ratified the Protocol.⁸⁴ The arrangement permitted the EU as a whole to advocate for, and assume, a fairly aggressive target, while also providing the flexibility to take account of differences in member state’s economic development, generation mix and so on.⁸⁵

The Protocol does not establish a set of full-fledged institutions.⁸⁶ Although not stated explicitly, the supreme governing body is the Conference of the Parties to Convention serving as the Meeting of the Parties, or the COP/MOP as it is known.⁸⁷ The COP/MOP is assigned the responsibility of keeping under review the implementation of the Protocol, and it is empowered to make “...the decisions necessary to promote its effective implementation”.⁸⁸ This is consistent with practice in international environmental law of bestowing quite wide legislative (or quasi-legislative) and administrative powers on conferences of the parties.⁸⁹ The

⁸² Since allowances were effectively grandfathered, being able to select a year when the economy was robust and emissions at a historical high point was potentially of considerable benefit. Among the countries different base years are Bulgaria (1989) and Poland (1988).

⁸³ If the group of countries fails to meet its collective target, each of the countries, and the regional integration organization that is a party to the Protocol, will be held liable according to its individual targets under the burden-sharing agreement. See art. 4(6).

⁸⁴ See Jürgen Lefevere, *The EU Greenhouse Gas Emission Allowance Trading Scheme*, in CLIMATE CHANGE AND CARBON MARKETS: A HANDBOOK OF EMISSIONS REDUCTIONS MECHANISMS 75, 77-88 (Farhana Yamin, ed., 2005). Internally, the burden-sharing agreement was made binding on the 15 member states of the EU. See Council Decision 2002/358/EC of 25 April 2002, art. 2, 2002 O.J. (L 130) 1, 2. Because article 4 of the Protocol does not permit amendments to burden-sharing agreements, the accession of 10 members to the Union in 2004 and a further two in 2007 has not altered the EU burden-sharing agreement.

⁸⁵ For example, the EU’s economically less-developed countries could increase their emissions over the 1990 baseline (Greece +30 per cent, Ireland +15 per cent and Portugal +40 per cent) while other countries accepted deeper cuts to compensate (Austria –25 per cent, Denmark –25 per cent and Germany –25 per cent).

⁸⁶ See Oberthür & Ott, INTERNATIONAL CLIMATE POLICY, *supra* note 45, at 240-241, detailing why a majority of the Parties to the Convention preferred not create new institutions for reasons of economy as well out of a desire to retain authority in the subsidiary bodies of the Convention.

⁸⁷ See *id.* at 242-243. That the COP/MOP is a separate entity from the COP appears from art.13(2)-(3) providing that in COP/MOP meetings non-Parties may participate as observers, but that decisions under the Protocol may be taken only by Parties to the Protocol. Similarly, when the COP/MOP meets, Bureau members who are not Parties to the Protocol shall be replaced by additional members who are Parties. (The Bureau consists of representatives elected in accordance with the regional groups of the United Nations and tasked with chairing and coordinating the COP and its various bodies.) See also *Report of the Subsidiary Body for Implementation on its Eighteenth Session*, para. 44, FCCC/SBI/2003/8 (2003), “The SBI recognized that the COP and the COP/MOP are legally distinct with separate agendas.”

⁸⁸ Protocol, art. 13(4).

⁸⁹ See Oberthür & Ott, INTERNATIONAL CLIMATE POLICY, *supra* note 45, at 243, noting that the elaboration of the compliance regime under art. 18 may add quasi-judicial powers to the list. See for developments with respect to MEAs generally, Jutta Brunnée, *COPing with Consent: Law-Making under Multilateral Environmental Agreements* 15, LEIDEN J. OF INT. LAW 1 (2002).

enumerated tasks of the COP/MOP include assessing the implementation of the Protocol and the extent to which progress towards the objective of the Convention is being achieved,⁹⁰ periodically examining the obligations of the Parties under the Protocol, considering and adopting reports on its implementation,⁹¹ and carrying out the development and periodic refinement of methodologies for the effective implementation of the Protocol.⁹² With respect to subsidiary organs, article 15 provides that the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI) established under the Convention shall also serve, respectively, as the SBSTA and SBI for the Protocol. As with the COP/MOP, non-Parties to the Protocol may participate as observers, but not in decisions concerning the Protocol.⁹³ Although the functions of the subsidiary organs are not specifically enumerated in the same manner as in the Convention, the Protocol in various places assigns tasks to the subsidiary organs, such as mandating the SBSTA to provide advice in relation to sinks and methodologies.⁹⁴

3.2.2.1 Joint implementation (JI)

JI and CDM involve the generation of credits from individual projects that result in emissions reductions relative to baseline emissions. Joint implementation (JI) is a project-based mechanism where emission reductions are achieved in accordance with projects implemented in an Annex 1 country by investors from another Annex 1 country. The investor/investing country can then claim the resulting emission reduction to sell on the market or credit it against the country's target.

The term joint implementation has a somewhat tangled history, but under the Protocol its meaning and ambit are clear and uncontroversial.⁹⁵ JI has its roots in Articles 4(2)(a) and (d) of the Convention, under which the Conference of Parties established a pilot phase for activities implemented jointly (AIJ). Under AIJ industrialized (Annex I parties) could implement projects reducing emissions of greenhouse gases or enhancing their removals through sinks in other countries, both industrialized and developing.⁹⁶ Participation in the AIJ is voluntary, and no credits are granted for any reductions achieved under the program.⁹⁷ However, the eligibility requirements for AIJ projects closely tracked those that were later made applicable to JI and the CDM, including that activities should result in real and measurable environmental benefits that would not have occurred in the absence of the project.⁹⁸

⁹⁰ Protocol, art. 13(4)(a).

⁹¹ See *id.* art. 13(4)(b).

⁹² See *id.* art. 13(4)(3) and art. 5.

⁹³ See *id.* Art. 15(2). Items of the agenda of the SBSTA and SBI will be clearly identified so that is clear in which capacity the bodies are acting, in other words under the Convention or Protocol.

⁹⁴ See *id.* art. 3(4) and art. 5(2).

⁹⁵ See Grubb et al, GUIDE AND ASSESSMENT, *supra* note 45, at 87-89.

⁹⁶ Decision 5/CP.1, in *Report of the Conference of the Parties on its Seventh Session*, addendum, Part II: Action taken by the parties, FCCC/1995/7/Add.1,

⁹⁷ The pilot phase of the AIJ continues, with 157 projects in 42 countries. See *Activities Implemented Jointly under the pilot phase: Seventh progress report*, UNFCCC/SBSTA/2006/8 (2006).

⁹⁸ Decision 5/CP.1, in *Report of the Conference of the Parties on its Seventh Session*, addendum, Part II: Action taken by the parties, para. 1(d), FCCC/1995/Add.1 See Charlotte Streck, *Joint Implementation:*

AIJ enabled countries to gain experience with a project-based mechanism, including an approximation of emissions reduction potential, costs, and likely barriers.⁹⁹

Although there are many similarities, it is important to distinguish JI from its close conceptual cousin, the CDM. JI projects take place between Annex 1 countries, and the mechanism is intended to assist Annex 1 parties comply with their emission reduction obligations under Article 3 of the Protocol. The CDM has a dual purpose: assist Annex 1 countries in meeting their emissions limitation and reduction obligations and promote sustainable development in host developing countries, for instance by promoting transfer of clean technology. An second important difference between the two mechanisms flows from the fact that JI projects can only be implemented in fellow Annex 1 countries, each of which is entitled to a set number of allowances, known as assigned amount units (AAUs), corresponding to its target under the Protocol. Emissions reductions generated by a JI project are known as emission reduction units (ERUs). The quantity of ERUs generated by a particular project is subtracted from the host countries' total number of AAUs. This means that JI projects do not introduce additional allowances into the system; the overall amount of emissions under the "cap" does not increase. Environmental integrity is safeguarded by the requirement that JI host country is required to maintain an appropriate inventory of GHG sources and sinks, as well as an accounting system for additions and subtractions from its allocation of AAUs. In contrast, CDM projects, which are not backed by the conversion of existing allowances, give rise to additional credits and thus raise the cap. In order to maintain the environmental integrity of the CDM – that is, avoid the issuing of credits not based on real reductions – the verification, monitoring and certification requirements for the CDM are more onerous than the equivalent JI provisions.¹⁰⁰

The basic eligibility requirements for JI projects are set out in Article 6(1), namely that projects require the approval of both countries involved (host and investor), that any reduction in emissions by sources or removal by sinks must be additional to any that would otherwise occur, and that countries maintain proper inventories and comply with the Protocol's reporting obligations. Article 6(3) provides that private sector entities may, subject to the authorization of the country concerned, participate in JI projects. During the negotiations, it was envisaged that the private sector would have a key role to play as investor in, and developer of, JI projects. However, since JI projects result in a subtraction from a host country's allocation of AAUs, with potential consequences for compliance with its emission reduction commitments, government supervision is important. Hence the proviso

History, Requirements, and Challenges, in LEGAL ASPECTS OF IMPLEMENTING THE KYOTO PROTOCOL MECHANISMS: MAKING KYOTO WORK 108-109 (David Freestone & Charlotte Streck, eds., 2005).

⁹⁹ See e.g. a study prepared for the Government of the Netherlands, which analyzed AIJ projects to estimate the potential market for credits under the CDM, including prices. NETHERLANDS ENERGY RESEARCH FOUNDATION (ECN) ET AL, POTENTIAL AND COST OF THE CLEAN DEVELOPMENT, OPTIONS IN THE ENERGY SECTOR: INVENTORY OF OPTIONS IN NON-ANNEX I COUNTRIES TO REDUCE GHG EMISSIONS (1999). Jason Anderson & Rob Bradley, *Joint Implementation and Emissions Trading in CEE*, in CLIMATE CHANGE AND CARBON MARKETS: A HANDBOOK OF EMISSIONS REDUCTIONS MECHANISMS, *supra* note 84, at 211-213.

¹⁰⁰ Streck, *supra* note 98, at 112. The requirements for CDM projects are discussed in greater detail in the next section.

that private sector participation is subject to authorization and the requirement that both the host and the purchasing countries must approve the project.

As noted above, developers of JI projects must demonstrate “additionality”, in other words make the case that project emissions will be lower than a credible baseline, which would have applied but for the project. The Protocol does not address the process for verifying additionality and other requirements for JI projects, simply stating that the parties “may...further elaborate guidelines for the implementation of this Article, including for verification and reporting.”¹⁰¹ The rules developed to implement JI provide for two variants. The first, known as “track one JI”, is available to host countries that have demonstrated certain reporting and accounting requirements. These countries may themselves – without additional oversight – verify that emissions reductions achieved by the project are in fact additional.¹⁰² Such self-verification does not jeopardize environmental integrity because, as noted earlier, reported project reductions, even if nominally inflated, are subtracted from the host country’s allocation of AAUs.¹⁰³ A second option, involving more oversight, is available for Annex 1 countries that do not meet the requirements for track one JI. In this case, an independent body, the Joint Implementation Supervisory Committee, carried out the tasks of ensuring that project design meets JI requirements, verifying emission reductions, and the issuance of ERUs.

For Annex 1 countries that are not on track to meet their Kyoto commitments from action alone, the attraction of JI stems from lower mitigation costs in the countries of Eastern Europe, as compared with costs in the more advanced industrialized economies.¹⁰⁴ In the process of transition to market economies most of these countries moved away from their earlier reliance on energy intensive and inefficient heavy industries. With emissions well below their 1990 baselines, several of the economies in transition will have a surplus of AAUs available in the first Kyoto commitment period from 2008-2012.¹⁰⁵ For host countries the advantages of JI over pure emissions trading lie in the transfer of clean energy technology, enhanced energy efficiency, and of course greater long-term reductions in GHG emissions. From the perspective of investors JI projects present fewer regulatory and related risks. This is particularly true for track one JI projects where risks associated with baselines, additionality and verification can be mitigated in a manner not feasible under the CDM.¹⁰⁶ At the same time, unclear institutional responsibilities in host countries, coupled with a lack of transparent approval procedures, and political uncertainties in some hosts, mean that the JI market has

¹⁰¹ Protocol, art. 6(2).

¹⁰² 16/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, addendum, Part II: Action taken by the Conference of the Parties, annex, para. 21, 23, FCCC/CP/2001/13/Add.2 (2003). See Jari Väyrynen & Franck Lecoq, *Track One JI and ‘Greening of AAUs’: How Could it Work?*, in *LEGAL ASPECTS OF IMPLEMENTING THE KYOTO PROTOCOL MECHANISMS: MAKING KYOTO WORK* *supra* note 98, at 156.

¹⁰³ The line separating international emissions trading of AAUs under Article 17 and Track One JI can become rather blurred. The implications are further explored by Väyrynen & Lecoq, *supra* note 102.

¹⁰⁴ The Japanese economy is already very energy efficient and has a low carbon intensity. Therefore domestic abatement costs are high, and Japan is an active participant in the market to acquire JI and CDM credits.

¹⁰⁵ Anderson & Bradley, *supra* note 99, at 203-205.

¹⁰⁶ Streck, *supra* note 98, at 125.

been slow to reach its full potential.¹⁰⁷ The value of JI market stood at US\$ 141 million in 2006, more than double that of the previous year.¹⁰⁸

The expansion in membership of the European Union in 2004 and again in 2007 has diminished the attractiveness of several Eastern European states as JI hosts. Upon joining the EU, these countries become subject to the Emissions Trading Scheme of the EU (EU ETS). The ETS covers some 12,000 installations accounting for almost 45 per cent of CO₂ emissions of the 25 European member states.¹⁰⁹ The ETS applies to a range of installations, including in the power generation, iron and steel, glass, and cement sectors. The first phase of the EU ETS covered the period 2005-2007, while the second phase will coincide with the Kyoto Protocol's first commitment period, from 2008 to 2012. The ETS is intended to assist the EU meet its Kyoto commitment of an 8 per cent reduction below 1990 levels.

The EU amended the legislation establishing the ETS so that certified emission reductions (CERs) from CDM projects and ERUs from JI projects could to be traded in the ETS.¹¹⁰ Subject to some limitations, the so-called "Linking Directive" makes it possible to convert project-based credits that meet the Kyoto standards into EU allowances.¹¹¹ Firms subject to the ETS can thus draw on CDM and JI credits in meeting their targets under the scheme. Interaction of the EU ETS with CDM and JI gives rise to the rather technical issue of "double counting", which "refers to a situation in which CERs or ERUs are issued as a result of reductions that also lead to a reduction from emissions from an installation covered by the [Emissions Trading] Directive."¹¹² In order to prevent double counting under the EU

¹⁰⁷ John O'Brien, *Optimism amid uncertainty? in KYOTO AND THE CARBON MARKETS: FINANCING CLIMATE POLICY TO 2012 AND BEYOND, A SPECIAL SUPPLEMENT to ENVIRONMENTAL FINANCE & CARBON FINANCE*, November 2006, S38.

¹⁰⁸ KARAN CAPOOR & PHILIPPE AMBROSI, WORLD BANK, STATE AND TRENDS OF THE CARBON MARKET 2007 3 (2007).

¹⁰⁹ See Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003, Establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, 2003 O.J. (L 275) 32.

¹¹⁰ See Directive 2004/101/EC of 27 October 2004, Amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms, 2004 O.J. (L 338) 18. For details on the "Linking Directive" see Lefevre, *supra* note 84, at 126-138.

¹¹¹). The Directive does not cap the number of CERs and ERUs that member states may introduce into the ETS, but provides that inclusion of an amount greater than 6 per cent of a member state's EU allowances will trigger a review process. CERs and ERUs from forestry-related projects are excluded.

¹¹² Lefevre, *supra* note 84, at 138. For instance, double counting would arise where a JI project is implemented at an installation subject to the ETS. The project will give rise to JI credits – which can be traded in the EU ETS – as well as freeing up EU allowances assigned to the particular installation. In order to prevent double counting, the operator of the installation is required to cancel a EU allowance for every JI credit (ERU) that is issued. For a more detailed discussion of double counting under the EU ETS and JI, see Streck, *supra* note 98, at 123-125. The provisions of the Linking Directive relating to double counting are regarded as having made JI projects in EU countries less attractive, leading to criticism from Japan which felt it was being denied access credits needed to meet its Kyoto obligations. Linking the EU ETS to other cap-and-trade schemes has been mooted from time to time and, if and when such arrangements come into being, double counting will also be an issue.

ETS and the Protocol, installations covered by the EU ETS are not eligible to generate ERUs under JI.

3.2.2.2 Clean development mechanism

The third flexibility mechanism is the clean development mechanism (CDM), which is established by Article 12 to serve the twin goals of assisting developing countries achieve sustainable development and to aid Annex 1 parties in meeting their emission limitation and reduction commitments.¹¹³ The CDM has its roots in a proposal for a Clean Development Fund advanced by Brazil, to be financed from fines levied on Annex 1 parties for non-compliance.¹¹⁴ As elaborated by the United States in the final Kyoto negotiations, the proposal was transformed into what is now the CDM, which incorporates the underlying principle of joint implementation.¹¹⁵

Like JI, the CDM is a project-based mechanism, but in this case credits may be earned for projects executed in developing countries. Every certified emission reduction (CER) is equivalent to a tonne of CO₂. For each CER purchased, an Annex 1 party is in effect increases its “cap”. Unlike under JI projects, the CERs generated by CDM projects are not backed by a subtraction from an Annex 1 parties’ assigned basket of allowances. Thus ensuring the environmental integrity of CDM projects is all the more important.¹¹⁶ Resulting greenhouse gas reductions must be real and measurable and “additional to any that would occur in the absence of the certified project activity”.¹¹⁷ Thus developers of CDM projects must demonstrate that a project’s reduction in GHG emissions goes beyond business as usual (BAU), which involves showing that emission reductions generated by the project are in addition to any that would have occurred in the project’s absence (the so-called ‘additionality’ criterion).¹¹⁸ CDM projects are also required to contribute to sustainable development, but the determination whether this criterion has been met rests with the host country. In order to ensure the environmental integrity of the CDM and its proper administration, the COP has developed detailed rules covering project validation, registration with the Executive Board, and the verification, certification and issuing of credits from CDM activities.¹¹⁹

¹¹³ Mark Kenber, *The Clean Development Mechanism: a tool for promoting long-term climate protection and sustainable development?* in CLIMATE CHANGE AND CARBON MARKETS: A HANDBOOK OF EMISSIONS REDUCTIONS MECHANISMS, *supra* note 84, at 263.

¹¹⁴ See Oberthür & Ott, INTERNATIONAL CLIMATE POLICY, *supra* note 45, at 165-166; FCCC/AGBM/1997/MISC.1/Add.3.

¹¹⁵ Naoki Matsuo, *CDM in the Kyoto negotiations: How CDM has Worked as a Bridge between Developed and Developing Worlds?* 8 MITIGATION AND ADAPTATION STRATEGIES FOR GLOBAL CHANGE 191, 197 (2003).

¹¹⁶ Ernestine Meijer & Jacob Werksman, *Keeping it Clean – Safeguarding the Environmental Integrity of the Clean Development Mechanism*, in LEGAL ASPECTS OF IMPLEMENTING THE KYOTO PROTOCOL MECHANISMS: MAKING KYOTO WORK, *supra* note 98, at 191

¹¹⁷ Protocol, art. 12(5).

¹¹⁸ For detailed discussion of baselines and additionality see Axel Michaelowa, *Determination of baselines and additionality for the CDM: a crucial element of the credibility of the climate regime*, in CLIMATE CHANGE AND CARBON MARKETS: A HANDBOOK OF EMISSIONS REDUCTIONS MECHANISMS, *supra* note 84, at 287.

¹¹⁹ For a summary of the CDM project cycle, see Farhana Yamin, *The international rules of the Kyoto Mechanisms*, in CLIMATE CHANGE AND CARBON MARKETS: A HANDBOOK OF EMISSIONS REDUCTIONS MECHANISMS, *supra* note 84, at 29-52; Maria Netto & Kai-Uwe Barani Schmidt, *CDM*

The implementation of the CDM is overseen by the CDM Executive Board (EB), which is composed of 20 members (ten full-time members and ten alternates) drawn from among Annex 1 and non-Annex 1 (developing countries).¹²⁰ The EB elaborates the rules and modalities governing the CDM, approves and registers CDM projects, issues CERs, and carries out other functions relating to the CDM.¹²¹ The EB is subject to the “guidance” of the Conference of Parties serving as the Meeting of the Parties (COP/MOP), which is the supreme body of the Protocol. The COP/MOP fulfils this function only in relation to a number of enumerated issues – for instance the rules of procedure of the EB and the geographical distribution of CDM projects – but it does not serve as a general avenue of appeal for decisions taken by the Board.¹²²

The EB has established several panels and working groups to assist it in carrying out its functions. The Methodology Panel, tasked with developing project methodologies, has attracted the most attention and scrutiny. Project developers and investors in the carbon market have criticized the Executive Board for supposedly overly stringent application of project approval criteria, lack of transparency, and insufficient resources and capacity leading to inability to cope with its workload.¹²³ While there have been some difficulties, a more charitable view is that the Board, as a key part of a unique governance structure, has done a reasonably good job in establishing the necessary rules for the operation of the CDM. Overall, the registration of projects is accelerating and the funding shortfalls that have plagued EB, due to its reliance on voluntary funding, will recede as it begins to benefit from the collection of administrative fees levied on CDM projects.

An analysis by United Nations Development Programme (UNDP) reveals that the geographic distribution of CDM projects is very uneven, with Asia and Latin America accounting for the lion’s share (96 percent of projects).¹²⁴ Together they are expected to generate around 95 percent of CERs flow through 2012; Africa is expected to garner only 3 per cent of CERs by that date. Moreover, the report notes that while some 80 per cent of projects employ technologies that have the potential to promote sustainable development in the host country, for instance energy

Project Cycle and the Role of the UNFCCC, in LEGAL ASPECTS OF IMPLEMENTING THE KYOTO PROTOCOL MECHANISMS: MAKING KYOTO WORK, *supra* note 98, at 175.

¹²⁰ See Decision 17/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, addendum, Part II: Action taken by the Conference of the Parties, Vol. II, annex, *Modalities and procedures for a clean development mechanism*, FCCC/CP./2001/13/Add.2 (2002). Members of the Executive Board serve in their personal capacity, are required to take a written oath of service, and may not have a pecuniary or financial interest in any aspect of a CDM project activity. See *supra*, decision 17/CP.7, respectively para. 8 (c), (e) and (f), *Modalities and procedures for a clean development mechanism*. As a body established under public international law the decisions of the Executive Board are probably not subject to review under domestic law. The EB is solely subject to the political and legal control of the COP/MOP.

¹²¹ Maria Netto & Kai-Uwe Barani Schmidt, *CDM Project Cycle and the Role of the UNFCCC Secretariat*, in LEGAL ASPECTS OF IMPLEMENTING THE KYOTO PROTOCOL MECHANISMS: MAKING KYOTO WORK, *supra* note *supra* note 98, at 177-180.

¹²² Decision 17/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, *supra* note 120, Annex, paras. 2-4. Farhana Yamin, *The international rules of the Kyoto Mechanisms*, in CLIMATE CHANGE AND CARBON MARKETS: A HANDBOOK OF EMISSIONS REDUCTIONS MECHANISMS, *supra*, note 84, at 34.

¹²³ For an expression of such views, see INTERNATIONAL EMISSIONS TRADING ASSOCIATION, 2006 STATE OF THE CDM: IETA POSITION ON THE CDM FOR COP-12/MOP-2, 11-20 (2006).

¹²⁴ UNDP, THE CLEAN DEVELOPMENT MECHANISM: AN ASSESSMENT OF PROGRESS, 11-12 (2006).

efficiency, a total of 21 projects abating emissions of industrial gases are expected to be responsible for almost half of all CERs through 2012. A fairly conservative estimate of CERs generated by 2012 would see the CDM supplying 15-25 per cent of the expected demand for Kyoto emission reductions, thus contributing to meeting the expected shortfall of Annex 1 countries at a relatively low abatement cost.¹²⁵ However, the report notes that it remains to be seen whether the CDM can deliver broader sustainable development benefits for host countries, for instance with respect to the transfer of clean technology.¹²⁶ A separate analysis of the “development dividend” – the social, economic and environmental benefits – for CDM host countries found that projects giving rise to the highest number of CERs received very low scores.¹²⁷ The overall contribution to mitigation is decidedly modest.¹²⁸ Looking ahead, the study concludes that: “[u]ncertainty concerning the post-2012 climate framework and its implications for the continued existence of a broad-based international carbon market is the single most important factor influencing the out look for CDM growth and evolution over the next 5 years.”¹²⁹

The CDM is at the intersection of international and domestic law: established under a treaty, the Kyoto Protocol, overseen by an international body exercising administrative functions, the Executive Board, in accordance with rules adopted by the Conference of the Parties. Project developers and investors – the key private entities in the system – are subject to both the provisions of Protocol and the international rules adopted by COP, decisions of the Executive Board, and domestic rules of the host country, for instance with respect to environmental impact assessments and taxation. While some have criticized this governance structure as unwieldy and bureaucratic, a more balanced perspective view might hold that progress in establishing an innovative and unusual set of institutions has been quite successful thus far.

3.2.2.3 International emissions trading

Under Article 17 Annex 1 parties to the Protocol may engage in emissions trading for the purposes of fulfilling their commitments. The Protocol provides that each Annex 1 party has a number of Assigned Amount Units (AAUs) corresponding to its individual emission allowance inscribed in Annex B of the Protocol.¹³⁰ The emission targets in Annex B to the Kyoto Protocol are expressed as a percentage

¹²⁵ See *id.* at 13-14.

¹²⁶ See HELEEN C. DE CONINCK ET AL, TECHNOLOGY TRANSFER IN THE CLEAN DEVELOPMENT MECHANISM, (ECN – Energy Research Centre of the Netherlands, ECN-E-07-009, 2007); Katrin Millock, *Technology transfers in the Clean Development Mechanism: an incentives issue* 7 ENVIRONMENT AND DEVELOPMENT ECONOMICS 449 (2002).

¹²⁷ AARON COSBEY, MAKING DEVELOPMENT WORK IN THE CDM: PHASE 2 OF THE DEVELOPMENT DIVIDEND REPORT, IISD (2007), <http://www.iisd.org/climate/global/dividend.asp>.

¹²⁸ It is estimated that by 2012 total CO₂ equivalent emissions (CO₂e) abated under the CDM will amount to upwards of 1 billion tonnes. According to the IPCC, from 2000-2005 annual world-wide emissions of CO₂ from fossil fuels and land-use are estimated to have been about 32 gigatonnes. The total reductions achieved under the CDM are thus equivalent to approximately 3.125 per cent of annual CO₂ emissions.

¹²⁹ UNDP, *supra* note 124, at 14-15.

¹³⁰ Protocol, art. 3(7).

relative to 1990 emissions; the AAUs simply express this as units of CO₂ equivalent emissions.

The concept of international emissions trading was introduced in the negotiations by the United States, winning the support of the other members of the JUSCANZ coalition (Japan, United States, Switzerland, Canada, Australia, Norway and New Zealand), but opposed initially by the EU and rejected by developing countries. In the knowledge that significant domestic emissions cuts would be politically difficult to obtain, the United States regarded trading as critical to meeting any target it might assume. With respect to the Russian Federation and other countries with economies in transition (EITs), the United States stressed that, as a consequence of their excess AAUs, they would stand to gain considerably under trading. The EU, skeptical at first, came to accept the concept, but argued that it should remain supplementary to domestic action. The most serious opposition came from the developing countries, who argued that trading would allow the United States, the largest emitter of GHGs, to avoid meaningful domestic action.¹³¹ This in turn threatened the position of countries such as China and India, which at times advocated the position that over time the per capita emissions of industrialized countries should contract, eventually converging at an equal per capita level with those of developing countries. Finally, developing countries were aware that under trading the Russian Federation potentially stood to gain from trading with its large number of surplus AAUs, with an attendant transfer of wealth.¹³² Flooding the market with AAUs would also have the effect of depressing the price of CERs generated by CDM projects in developing countries.

3.2.2.4 Compliance mechanism

An important provision of the Protocol that remains to be covered is Article 18. It requires the COP to “approve appropriate and effective procedures and mechanisms to determine and to address cases of non-compliance with the Provisions of the Protocol”. This rather basic provision, while specifying that the procedure should include an “indicative list of consequences”, left a great deal to be fleshed out in the post-Kyoto negotiations in the COP.¹³³ Objections to the proposal for binding penalties were overcome with the insertion of the final sentence of the Article, providing that “[a]ny procedures or mechanisms...entailing binding consequences shall be adopted by means of an amendment”.¹³⁴ The compliance mechanism of the Kyoto Protocol has been hailed as unique to international law.¹³⁵

¹³¹ See Grubb et al, *GUIDE AND ASSESSMENT*, *supra* note 45, at 94-95.

¹³² With the withdrawal of the United States from the Kyoto Protocol, the market for credits from Russia and other EITs is much smaller. In any event, it is thought that buyers will be reluctant to purchase “hot air” or windfall allowances. Various options are being explored to “green” such allowances. See Jari Väyrynen & Franck Lecoq, *Track One II and ‘Greening of AAUs: How Could It Work*, in *LEGAL ASPECTS OF IMPLEMENTING THE KYOTO PROTOCOL MECHANISMS: MAKING KYOTO WORK*, *supra* note 98, at 155.

¹³³ For details, see Werksman, *supra* note 34; Jacob Werksman, *The Negotiation of a Kyoto Compliance System*, in *IMPLEMENTING THE CLIMATE REGIME: INTERNATIONAL COMPLIANCE*, 17 (Olaf Schramm Stokke et al, eds., 2005).

¹³⁴ See Oberthür & Ott, *INTERNATIONAL CLIMATE POLICY*, *supra* note 45, at 216-218.

¹³⁵ Jacob Werksman, *The Negotiation of a Kyoto Compliance System*, in *IMPLEMENTING THE CLIMATE REGIME: INTERNATIONAL COMPLIANCE*, 17, 19 (Olaf Schramm Stokke et al, eds., 2005).

Together with the market-based flexibility mechanisms it comprises the innovative features of the Protocol. This section starts with a brief outline of approaches to compliance in international environmental law. This scene-setting part is followed by a description of the compliance mechanism itself.¹³⁶

Classically, breach of an obligation under international law entitles the wronged party to reparation or compensation – such as in the seminal *Trail Smelter* arbitration¹³⁷ – with the parties arguing their case before an independent third party. In truth, this third-party dispute resolution is quite uncommon in international law, and even more so in international environmental law.¹³⁸ For one thing, states tend to avoid the confrontational (and unpredictable) approach entailed by formal dispute settlement, generally preferring negotiations. More importantly, traditional dispute settlement – akin to domestic tort action – is simply not appropriate for harms involving a range of actors, diffuse causation, and long time-scales.¹³⁹ In such circumstances, a process resting on monitoring, supervision and management is a better means of achieving the objectives of the instrument concerned. Accordingly some scholars view non-compliance procedures, whether formal or informal, as a natural extension of existing information-gathering, monitoring and supervision activities that are normally carried out by the conferences of the parties of many treaties.¹⁴⁰ This view is strongly represented by the so-called managerial school, which holds that although many international regimes invest little in explicit enforcement, the degree of compliance is quite good.¹⁴¹ This position is supported by a number of empirical studies.¹⁴² A conclusion drawn from this line of thought is that compliance does not derive predominantly from deterrent effects or consequences. Another group of scholars, however, regard enforcement and the calculations underlying compliance and participation as central to the design of effective international regimes.¹⁴³ Faced with evidence of relatively widespread compliance, advocates of this position ask whether states choose to participate only in treaties where compliance imposes little or no cost. Finally, it has also been noted that the

¹³⁶ See also on the compliance mechanism Geir Ulfstein & Jacob Werksman, *The Kyoto Compliance System: Towards Hard Enforcement*, in IMPLEMENTING THE CLIMATE REGIME: INTERNATIONAL COMPLIANCE, *supra* note 135, at 39; Farhana Yamin, *The International Rules on the Kyoto Mechanisms*, in CLIMATE CHANGE AND CARBON MARKETS: A HANDBOOK OF EMISSIONS REDUCTIONS MECHANISMS, *supra* note 84, at 61-66; Andries Nentjes & Ger Klaassen, *On the Quality of Compliance Mechanisms of the Kyoto Protocol* 32(4) ENERGY POLICY 531, 534 (2004); CHRISTIAN HOLTWISCH, DAS NICHTEINHALTUNGSVERFAHREN DES KYOTO-PROTOKOLLS: ENTSTEHUNG-GESTALT-WIRKUNG (2006).

¹³⁷ *Trail Smelter Arbitration* (United States v. Canada) 33 A.J.I.L. 182 (1939) and 35 A.J.I.L. 684 (1941).

¹³⁸ A notable exception is the *Gabcikovo-Nagymaros Dam Case* (Hungary v. Slovakia) ICJ Rep. (1997).

¹³⁹ PATRICIA BIRNIE & ALAN BOYLE, INTERNATIONAL LAW & THE ENVIRONMENT 180 (2nd ed., 2002).

¹⁴⁰ See *id.*

¹⁴¹ ABRAM CHAYES & ANTONIA HANDLER CHAYES, THE NEW SOVEREIGNTY: COMPLIANCE WITH TREATIES IN INTERNATIONAL REGULATORY REGIMES (1995).

¹⁴² See ENGAGING COUNTRIES: STRENGTHENING COMPLIANCE WITH INTERNATIONAL ENVIRONMENTAL ACCORDS (Edith Brown Weiss & Harold K. Jacobson, eds., 1998).

¹⁴³ See SCOTT BARRETT, ENVIRONMENT AND STATECRAFT (2003); Scott Barrett & Robert Stavins, *Increasing Participation and Compliance in International Climate Change Agreements*, 3 INTERNATIONAL ENVIRONMENTAL AGREEMENTS: POLITICS, LAW AND ECONOMICS 349-376 (2003).

perceived legitimacy¹⁴⁴ and fairness¹⁴⁵ of a particular rule will influence parties' compliance with its terms.

The process of drawing up the rules for a compliance mechanism began at the first conference after the adoption of the Protocol. The Buenos Aires Programme of Work, adopted at COP-4 in 1998, established the Joint Working Group on compliance, which was mandated to articulated procedures by which "compliance with the obligations under the Kyoto Protocol should be addressed".¹⁴⁶ At the resumed sixth Conference Bonn, agreement was reached, among other things, on the objectives of the mechanism, the consequences of enforcement, the scope of the enforcement, and the conditions for lodging appeals.¹⁴⁷ At COP-7 in Marrakech parties agreed that the compliance mechanism would consists of a Compliance Committee, with two functioning branches, a Facilitative Branch and an Enforcement Branch.¹⁴⁸ The Committee consists of twenty members, with ten elected to serve in each respective branch. Members, who serve in their individual capacities, and must have recognized "competence relating to climate change and in relevant fields such as the scientific, technical, socio-economic or legal fields."¹⁴⁹ Membership in each branch is composed as follows: one member from each of the five regional groups of the United Nations;¹⁵⁰ one member from the small island developing states; two members from Parties included in Annex 1; and two members from non-Annex 1 parties. This means that developing countries have a majority representation on both branches. The Committee is required to make "every effort to reach agreement on any decision by consensus."¹⁵¹ Where this fails, decisions shall be adopted by a majority of three-fourths of the members present and voting. However, as Annex 1 parties were unwilling to permit developing country members have the final say in the Enforcement Branch, a double majority provision applies – decisions also require a three-fourths majority of members of Annex 1 parties.

Expert review teams (ERTs) are responsible for reviewing Annex 1 parties' performance of their technical reporting requirements, for example with respect to inventories of GHG sources. ERTs form a crucial part of the compliance system. As independent and technical experts they are not meant to make judgments on compliance, but instead to raise "questions of implementation". ERTs are drawn up by the Secretariat of the Convention, from a list nominated by the parties. Action by the Committee can be triggered in the following ways: questions of implementation raised in reports submitted by the ERTs; by a party with respect itself; or by party

¹⁴⁴ THOMAS M. FRANCK, *THE POWER OF LEGITIMACY AMONG NATIONS* (1990).

¹⁴⁵ THOMAS M. FRANCK, *FAIRNESS IN INTERNATIONAL LAW AND INSTITUTIONS* (1995).

¹⁴⁶ Decision 8/CP.4, in *Report of the Conference of the Parties on its Fourth Session*, addendum, Part II: Action taken by the Conference of the Parties, annex 2, FCCC/CP/1998/16/Add.1 (1999).

¹⁴⁷ Decision 27/CMP.1, in *Report of the Conference of the Parties serving as the meeting of the Parties*, addendum, Part II: Action taken by the Conference of the Parties serving as the meeting of the Parties, FCCC/KP/CMP/2005/8/Add.3 (2006)

¹⁴⁸ Decision 24/CP.7, in *Report of the Conference of the Parties*, addendum, Part II: Action taken by the Conference of the Parties, vol. III, annex, FCCC/CP/2001/13/Add.3 (2002).

¹⁴⁹ See *id.* at annex, section II.

¹⁵⁰ They are: African Group, Latin American and Caribbean, Asian Group, Eastern European, and Western Europe and Other.

¹⁵¹ Decision 24/CP.7, in *Report of the Conference of the Parties*, *supra* note 148, at annex, section II.

with respect to another party.¹⁵² After allocation to one or other branch by the bureau of the Committee, the relevant branch carries out an initial screening, including weeding out *de minimis* submissions.

The mandate of the Facilitative Branch consists of providing advice and facilitation to the parties in implementing the Protocol, and promoting compliance by parties with their obligations, “taking into account the principle of common but differentiated responsibilities and respective capacities”.¹⁵³ With respect to matters falling outside the mandate of the Enforcement Branch, the Facilitative Branch is responsible for addressing “questions of implementation” – the technical term for matters brought before the Committee – concerning steps taken by industrialized countries to minimize the adverse effects of climate change response measures on developing countries, and information provided by Annex 1 countries on the extent to which use of the flexibility mechanisms is supplementary to domestic mitigation efforts.¹⁵⁴ In addition, as a means of “providing for early warning of potential non-compliance” the Facilitative Branch is responsible providing parties with advice and facilitation on a number of issues, prior to the first commitment period. These provisions appear designed to allow one party to involve the Facilitative Branch in a question whether another party has, before the commitment period, established the requisite national monitoring and reporting systems.

The consequences that Facilitative Branch is competent to apply, taking into account the principle of common but differentiated responsibilities, encompass, among other things, the facilitation of financial and technical assistance, including technology transfer and capacity building from sources other than climate funds established under the Convention and Protocol, and the formulation of recommendations to the Party concerned, taking into account Article 4(7) of the Convention, which states that effective implementation by developing countries of their commitments will depend on industrialized countries meeting their commitments to make available financial resources and technology.¹⁵⁵ It is clear from this outline of consequences, as well as the contrasting language relating to the Enforcement Branch, that decisions of the Facilitative Branch decisions are not intended to be binding. While the Facilitative Branch “shall decide” on the application of consequences, its enforcement counterpart “determine[s] that a Party is not in compliance”.¹⁵⁶

The Enforcement Branch is responsible for determining whether an Annex 1 party is not in compliance with its emissions limitation and reduction target under the Protocol; the methodological requirements for estimating emissions by sources and removals by sources and the reporting requirements; and the eligibility requirements for participation in Joint Implementation (JI), the clean development mechanism (CDM), and international emissions trading.¹⁵⁷ At a more technical level, the Enforcement Branch is also empowered to make adjustments and corrections in the event of disagreements between a party and an expert review team regarding,

¹⁵² See *id.* at annex, section VI.

¹⁵³ See *id.* at annex, section IV.

¹⁵⁴ See *id.* at annex, section IV.

¹⁵⁵ See *id.* at annex, section XIV.

¹⁵⁶ See *id.* at annex, section XIV and XV.

¹⁵⁷ See *id.* at annex, section V.

respectively, inventories under Article 5(2) and databases for the accounting of assigned amount units.

If the Enforcement Branch determines that a party is not in compliance with the Protocol's requirements concerning the GHG monitoring and accounting systems, that party is obliged to submit to the Enforcement Branch for review and assessment a plan analyzing the causes of non-compliance, measures to remedy the non-compliance and a timetable for doing so.¹⁵⁸ Where the Enforcement Branch determines that an Annex 1 party does not meet eligibility requirements for JI, CDM or international emissions trading, "it shall suspend the eligibility of that Party".¹⁵⁹ Provision is made for reinstatement. Finally, revealing the teeth of the compliance system, where the Branch determines that a party has exceeded its assigned amount, a deduction equal to the excess plus 30 per cent (excess times 1.3) will be made from the assigned amount for the second commitment period. In addition, a non-compliant party is required to draw up a compliance action plan and is suspended from making transfers under international emissions trading, pending reinstatement.¹⁶⁰

If a party believes it has been denied due process by a final decision of the Enforcement Branch, it may lodge an appeal with the COP/MOP, which may, by a three-fourths majority of parties present and voting, override a Enforcement Branch decision.¹⁶¹ Aside from the appeals procedure, the relationship of the COP/MOP with respect to the Committee is explicitly limited to matters such "providing general policy guidance", considering the reports of the Committee, and adopting decisions on administrative and budgetary matters. This indicates that those countries who wished to insulate the Committee from more politicized COP/MOP deliberations succeeded, at least on paper, in doing so. Equally, the potential grounds for appeal appear fairly narrow, subject of course to the interpretation adopted by the Enforcement Branch. Certainly, the end result is closer to a process with fairly predictable consequences and limited discretion, as advocated by the United States, rather than a case-by-case review, preferred by the EU.¹⁶² Since decisions by the Enforcement Branch will presumably be based largely on technical questions – either submitted by the expert review team or another party – the scope for arguing denial of due process appears limited. Moreover, the Enforcement Branch is likely to evaluate all information carefully. The material on which the Branch bases its determinations would in practice consist of the report of the ERT or the party having raised the question. Outside organizations, such as NGOs, are permitted to make submissions. The Enforcement Branch is empowered to appoint experts to assist it. Some deference by the Enforcement Branch to factual contentions by the party before it, as is found in the practice of judicial and quasi-judicial bodies with respect to findings of fact, would not be surprising.

The generally positive assessment of the compliance regime must be balanced against the critical views of some scholars. Barrett, for instance, singles the

¹⁵⁸ See *id.* at annex, section XV.

¹⁵⁹ See *id.*

¹⁶⁰ See *id.*

¹⁶¹ See *id.* at annex, section XI.

¹⁶² Werksman, *supra* note 133, at 24-25.

compliance regime out as one of the Protocol's grave defects.¹⁶³ Barrett points out that there is little to prevent a party determined to have exceeded its emissions quota from simply carrying its "penalty" from one commitment period to the next. In addition, a party found to be non-compliant, will bargain for a generous allocation in a succeeding commitment period. In short, he argues that the consequences contemplated in the non-compliance procedure are simply not enforceable.

Another observer of the compliance system notes that in the course of its negotiation the parties gradually moved away from the "soft" managerial compliance regime, exemplified by the Montreal Protocol, towards "hard" compliance.¹⁶⁴ In essence, it appears that the parties came to believe that it was appropriate that tougher compliance provisions should back binding emissions limitation and reduction commitments. The Kyoto compliance system is also distinguished from its Montreal Protocol counterpart in that the tools of the managerial approach – technical and financial assistance – are of less relevance to the exclusively industrialized group of countries subject to binding targets under the Protocol.

3.3 Finalizing the Protocol - Consolidation and change – the long road to entry into force

Having lingered on life support for a number of years, its imminent demise certified by critics,¹⁶⁵ the Protocol finally entered into force on 16 February 2005.¹⁶⁶ The legal instrument adopted in 1997 set targets and timetables, but the technical details to bring the overall framework into operation remained to be worked out. This task, in what came to be known as the "Kyoto process", fell to the Conference of the Parties to Convention, which, in the period before the Protocol came into force, was requested to carry out a range of tasks to ensure its prompt start.¹⁶⁷ This process of filling in the gaps is covered in greater detail in this part.

Like the Convention, the Protocol is also in many respects a framework instrument, with the drafters having left many details to subsequent negotiation. In particular, the rules for the market-based flexibility mechanisms remained to be elaborated. The same was true for other basic operational details relating to reporting and accounting for emissions, financial assistance for developing countries and the compliance mechanism. After protracted negotiations, most of these issues were resolved at the seventh Conference of the Parties in Marrakech in 2001, where the parties adopted the so-called "Marrakech Accords" containing the Protocol rulebook. This chapter traces the completion – and to an extent, evolution – of the

¹⁶³ Barrett & Stavins, *supra* note 143, at 350.

¹⁶⁴ Werksman, *supra* note 133, at 22. See already Werksman, *supra* note 34, at 48-66.

¹⁶⁵ See DAVID VICTOR, *THE COLLAPSE OF THE KYOTO PROTOCOL AND THE STRUGGLE TO SLOW GLOBAL WARMING* (2001).

¹⁶⁶ The Russian Federation deposited its instrument of ratification with the United Nations on November 18, 2004, following a long period of uncertainty and equivocation.

¹⁶⁷ See decision 1/CP.3, in *Report of the Conference of the Parties on its Third Session*, addendum, Part II: Action taken by the Conference of the Parties, FCCC/CP/1997/7/Add.1 (1998). See also Oberthür & Ott, *INTERNATIONAL CLIMATE POLICY*, *supra* note 45, at 245. In effect the Conference of the Parties to the Convention served as an ad hoc preparatory body for the first Conference of the Parties serving as the meeting of the Parties to the Protocol, or COP/MOP in shorthand. The first session of the COP/MOP formally adopted the COP decisions taken in preparation for the entry into force of the Protocol.

Protocol through the various Conferences of the Parties. It concludes with a short assessment of the strengths and weaknesses of the climate regime.

COP-4: Attending to unfinished business

The Kyoto Protocol was adopted at the third Conference of the Parties in 1997. COP-4, the first meeting of the parties after the adoption of the Kyoto Protocol, was an opportunity to deal with the “unfinished business” from those climactic negotiations.¹⁶⁸ The parties adopted a number of decisions - the Buenos Aires Plan of Action – that established a negotiating agenda for the coming into operation of the Protocol.¹⁶⁹ which essentially. The Plan covered a number of issues, including: the financial mechanism; the development and transfer of technology; the implementation of Convention and Protocol Articles concerning adverse effects of climate change on developing countries; and the Kyoto mechanisms.

With respect to the financial mechanism, the Parties agreed that the restructured Global Environment Facility (GEF) would serve as an entity entrusted with the operation of the financial mechanism referred to in Article 11 of the Convention and that the COP would review the performance of the GEF every four years, in accordance with guidelines agreed at the meeting.¹⁷⁰ Among other things, it was also agreed that the GEF should fund the full cost of initial and subsequent reports by developing countries on emissions and measures taken to implement the Convention (known as national communications).¹⁷¹ Demonstrating the early concern of developing countries regarding adaptation and vulnerability, the GEF was also asked to implement adaptation response measures in particularly vulnerable countries, such as preparations for adaptation activities and related capacity building.¹⁷² The decision on the adverse impacts of climate change launched work program to examine the issue, including identification and consideration of measures

¹⁶⁸ Grubb, GUIDE AND ASSESSMENT, *supra* note 45, at 248-253 (1999). For summary of the meeting see also *Report of the Fourth Conference of the Parties to the Framework Convention on Climate Change* 12 (97) EARTH NEGOTIATIONS BULLETIN (1998), available at <http://www.iisd.ca/vol12/>. The Earth Negotiations Bulletin (ENB) is widely regarded as a factual and authoritative source of information on international environmental and sustainable development negotiations.

¹⁶⁹ See decision 1/CP.4, in *Report of the Conference of the Parties on its Fourth Session*, addendum, Part II: Action taken by the Conference of the Parties, FCCC/CP/1998/16/Add.1 (1999).

¹⁷⁰ See *id.* decision 3/CP.4.

¹⁷¹ See *id.* See also UNFCCC art. 4(1) and art. 12(1).

¹⁷² So-called “stage II” activities, where “stage I” consist of planning, the identification of vulnerable areas and regions, and capacity building. See decision 11/CP.1, in *Report of the Conference of the Parties on its First Session*, addendum, Part II: Action taken by the Conference of the Parties, para 4(d)(i)-(ii), UNFCCC/CP/1995/7/Add.1 (1996). The GEF has until recently limited its activities with respect to adaptation to planning and preparations for adaptation in the form of support for developing countries’ national communications. The lack of support for actual adaptation projects has been a source of frustration for many developing countries, particularly small island developing states (SIDS). In 2004 the GEF launched the US\$ 50 million Strategic Priority on Adaptation (SPA), which is intended to pilot an operational approach to adaptation. See GLOBAL ENVIRONMENT FACILITY, GEF ASSISTANCE TO ADDRESS ADAPTATION, GEF/C.23/Inf.8/Rev.1 (2004) and GLOBAL ENVIRONMENT FACILITY, JOINT SUMMARY OF THE CHAIRS, GEF COUNCIL MEETING, 19-21 May 2004, para. 26 (2004), available at: http://www.gefweb.org/Documents/Council_Documents/GEF_C23/gef_c23.html#JointSummary

such as technology transfer and insurance.¹⁷³ The decision on the Kyoto (flexibility) mechanisms set a deadline of COP-6 in 2002 for the Parties to take decisions on the rules to flesh out the details necessary to make these mechanisms operational.¹⁷⁴

The Conference highlighted once again the persistent fault-line between industrialized and developing countries, which came to fore with the proposal by Argentina, tacitly supported by the United States, to place the issue of voluntary commitments for developing countries on the agenda.¹⁷⁵ The proposal faced immediate and fierce resistance from G-77 and China, representing the developing countries. After the predictable rejection of the proposal, Argentine President Menem pledged that his country would assume a voluntary target at the next Conference of the Parties.¹⁷⁶ (At recent Conferences, for instance the twelfth Conference of the Parties in Nairobi in 2006, the Russian Federation has persistently advocated the amendment of the Protocol to allow for voluntary commitments by developing countries.¹⁷⁷) In legal terms – and consistent with the principle of common but differentiated responsibilities – the Protocol does not provide for the negotiation or assumption of voluntary commitments. Discussion of such commitments engenders enormous suspicion among developing countries who regard them as a “slippery slope” to binding commitments, as well as undermining of the principle of common but differentiated responsibilities.

A second example of the fault-line evident at COP-4, one that continues to be manifested in the negotiations, related to the review of the adequacy of commitments under the Convention.¹⁷⁸ While there was agreement on the inadequacy of commitments, Parties could not reach agree on the reasons, with developing countries criticizing insufficient mitigation by the industrialized countries, some of who in turn drew attention to the former’s lack of emissions reduction obligations. Similarly, at the 12th Conference of the Parties in 2006, great difficulty was experienced in reaching agreement on the mandated review of the Kyoto Protocol.¹⁷⁹ The interests, arguments and chief protagonists remained largely unchanged.

¹⁷³ See decision 5/CP.4, in *Report of the Conference of the Parties on its Fourth Session*, *supra* note 169. It should be noted that Protocol art. 4 refers to “adverse effects of climate change and/or the impacts of response measures” on non-Annex 1 countries. The reference to the impact of response measures reflects the concern of the OPEC countries that mitigation policies will affect their economies. See Grubb, *GUIDE AND ASSESSMENT*, *supra* note 45, at 14, 141.

¹⁷⁴ Decision 7/CP.4, in *Report of the Conference of the Parties on its Fourth Session*, *supra* note 169.

¹⁷⁵ *Report of the Fourth Conference of the Parties to the Framework Convention on Climate Change* 12 (97) EARTH NEGOTIATIONS BULLETIN (1998).

¹⁷⁶ In the end Argentina took no action in this regard.

¹⁷⁷ The Russian Federation’s insistence on this point caused the 11th Conference of the Parties in December 2005 to extend into the morning hours, with issue reportedly only resolved (temporarily) by an eleventh-hour phone call to President Putin. The proposal was once again pressed at the 12th Conference of the Parties in November 2006. For the text of the “Russian Proposal” as discussed at COP-12, see *Report of the President on consultations concerning the proposal of the Russian Federation to develop appropriate procedures for the approval of voluntary commitments* FCCC/KP/CMP/2006/MISC.4, available at <http://www.unfccc.int>.

¹⁷⁸ UNFCCC, art. 4(2)(d).

¹⁷⁹ Protocol, art. 9. Essentially, Parties at COP-12 side-stepped a thorough review and instead agreed to begin in 2007 preparations for a second review of the Protocol in 2008.

COP-5: Pause and prelude

Hailed as a modest success, COP-5 was in truth largely a prelude to the more substantive decisions scheduled for COP-6.¹⁸⁰ The meeting adopted a number of important decisions on technical issues such as guidelines for reporting of annual inventories by Annex 1 countries¹⁸¹ and guidelines for expert review of inventories submitted by Annex 1 countries.¹⁸² These decisions contributed to the transparency, integrity and comparability of emissions data – all critical qualities in the negotiations on climate change. The modalities and procedures for the flexibility mechanisms, particularly the CDM, and the design of the compliance mechanism were key topics discussed. In both cases the COP adopted decisions requesting the relevant subsidiary bodies working on the two topics to continue their work with a view to adopting decisions by the COP at its 6th Session. With respect to the CDM, non-governmental organizations were vocal in rejecting the eligibility of nuclear energy as an option.

COP-6: Things fall apart

The 6th Conference of the Parties convened in The Hague with the aim of completing the negotiations on the topics under the Buenos Aires Programme of Action. Despite vigorous attempts to rescue the meeting,¹⁸³ it ended in failure with the parties unable to reach agreement on a number of issues.¹⁸⁴ Among the issues that derailed the negotiations were disagreements to what extent CDM and JI should be “supplemental” to domestic action by Annex 1 countries;¹⁸⁵ how much credit

¹⁸⁰ *Summary of the Fifth Conference of the Parties to the Framework Convention on Climate Change* 12 (123) EARTH NEGOTIATIONS BULLETIN (1999).

¹⁸¹ Decisions 3/CP.5 and 4/CP.5, in *Report of the Conference of the Parties on its Fifth Session*, addendum, Part II: Action taken by the Conference of the Parties, UNFCCC/CP/1999/6/Add.1.

¹⁸² Decision 5/CP.5, in *Report of the Conference of the Parties on its Fifth Session*, *supra* note 181.

¹⁸³ When difficulties surfaced, the President of the COP, Mr. Jan Pronk of the Netherlands, tried to cluster related issues for negotiation in high-level groups. See *Summary of the Sixth Conference of the Parties to the Framework Convention on Climate Change*, 13-25 November 2000, 12 (163) EARTH NEGOTIATIONS BULLETIN (2000). When negotiations stalled, the President submitted, in his personal capacity, a Note with proposals designed to achieve a breakthrough. See Decision 1/CP.6, in *Report of the Conference of the Parties on its Sixth Session*, addendum, Part II: Action taken by the Conference of the Parties, Vol. II, annex, FCCC/CP/2000/2/Add.2 (2001).

¹⁸⁴ Andrew C. Revkin, *Odd Culprits in Collapse of Climate Talks*, N.Y. TIMES, November 28, 2000. For an analysis of the meeting and its sequels, see SURAJE DESSAI, THE CLIMATE REGIME FROM THE HAGUE TO MARRAKECH: SAVING OR SINKING THE KYOTO PROTOCOL? (Tyndall Centre Working Paper no. 12, 2001), http://www.tyndall.ac.uk/publications/working_papers/wp12.pdf; CHRISTIAN EGENHOFER & JAN CORNILLIE, REINVENTING THE CLIMATE NEGOTIATIONS: AN ANALYSIS OF COP 6 (CEPS Policy Brief, No. 1, 2001), <http://www.ceps.be>.

¹⁸⁵ Art. 6(1)(d) of the Protocol provides that the acquisition of ERUs from JI projects should be “supplemental to domestic action” for the purposes of meeting emission reduction commitments. Similarly, Article 12(3)(b) states that Annex 1 countries may use CERs from CDM projects “to contribute to compliance with part of their emission reduction obligations”. The “supplementarity” proviso was supported by the European Union and others concerned that the uncapped recourse to the flexibility mechanisms would allow Annex 1 countries to avoid taking domestic action to reduce emissions. The exact meaning of the “supplemental” and “part of” provisions has remained contested.

countries should get for the carbon dioxide absorbed by forests and grasslands;¹⁸⁶ and the compliance mechanism.¹⁸⁷ The COP suspended its sessions and requested the President “to seek advice on the desirability of resuming that session in May/June 2001 in order to complete work”.¹⁸⁸ Overall, aside from the divergence regarding specific issues, observers identified the sheer scale of the agenda and the lack of trust and understanding among parties as reasons for failure.¹⁸⁹

COP-6bis: Compromise and concessions

After the meltdown at The Hague, the resumed 6th Session of the Conference of the Parties, COP-6 (Part II), ended with negotiators managing to reach agreement on most of the critical political issues relating to the implementation of the Kyoto Protocol. This was despite – or perhaps partly because of – unfavorable developments in the United States. Responding to a letter from a group of Senators requesting clarification of his stance on the Protocol, President Bush, stated his opposition to the Protocol on the basis that it exempted major emitters and would harm the U.S. economy.¹⁹⁰ In June, the President Bush confirmed the United States’ rejection of the Kyoto Protocol and unveiled the Administration’s climate change program, with a focus on research and technology.¹⁹¹ The U.S opposition to the Protocol opened a rift in transatlantic relations.¹⁹² At the same time, the supporters of the Protocol, in the first place the European Union, were aware that if they could not clinch a deal on the key outstanding issues, there would probably not be another opportunity to resuscitate the treaty.

Progress was made in Bonn regarding four main areas: the rules for emissions trading and the flexibility mechanisms; the eligibility of forestry projects

¹⁸⁶ The technical term of art is land-use, land-use change and forestry (LULUCF). Under Article 3(3) Annex 1 parties can count removals by sinks resulting from direct human-induced LULUCF activities “limited to afforestation, deforestation and reforestation since 1990”. This approach entails methodological and measurement difficulties of its own, but the clear limitation in Article 3(3) is muddled somewhat by Article 3(4), which directs the COP to decide on rules and guidelines for counting “additional human-induced activities”, such as forestry management and cropland management. The United States advocated recognition of what it claimed were extensive CO₂ savings from sinks through forestry management, while the EU preferred much more limited recognition of sinks activities. See DESSAI, *supra* note 184, at 4.

¹⁸⁷ While the EU argued for a strong compliance mechanism, countries such as Australia, Japan and the Russian Federation preferred a non-binding system. The parties also disagreed over the composition of compliance bodies, with the Annex 1 countries unwilling to accept equal regional representation as advanced by the G-77 group. See *Summary of the Sixth Conference of the Parties to the Framework Convention on Climate Change*, 13-25 November 2000, 12 (163) EARTH NEGOTIATIONS BULLETIN (2000).

¹⁸⁸ Decision 1/CP.6, in *Report of the Conference of the Parties on its Sixth Session*, *supra* note 183, at para. 2.

¹⁸⁹ DESSAI, *supra* note 184, at 4-5 (2001); Michael Grubb & Farhana Yamin, *Climatic collapse at The Hague: what happened, why and where do we go from here?* 7 INTERNATIONAL AFFAIRS 261-276 (2001).

¹⁹⁰ President G.W. Bush, Text of letter to Senators Helms, Craig, Hagel, and Roberts, March 13, 2001. <http://www.whitehouse.gov/news/releases/2001/03/20010314.html>.

¹⁹¹ See President G.W. Bush, *President Bush Discusses Global Climate Change*, Office of the Press Secretary, The White House, 11 June 2001, available at <http://www.whitehouse.gov/news/releases/2001/06/20010611-2.html>.

¹⁹² See e.g. Frank Bruni, *Deep U.S. – Europe Split Casts Long Shadow on Bush Tour*, N.Y. TIMES, June 15, 2001. A discussion of the various diplomatic efforts to bring the Administration back to the table is summarized by DESSAI, *supra* note 184, at 5-8.

under the CDM and rules on the counting of forestry management; funding and capacity building for developing countries to combat climate change; and key aspects of the compliance mechanism. At the beginning of the second week of negotiations the Parties agreed to adopt a political statement – the Bonn Agreement – proposed by the President, which encapsulated agreement on the outstanding issues, with the understanding that negotiations would continue on individual decisions.¹⁹³ The Bonn Agreement settled certain issues that had bedeviled COP-6 in The Hague, among them that the flexibility mechanisms “shall be supplemental to domestic action, and that domestic action shall thus constitute a significant element” of the effort made by Annex 1 parties to meet their emission reduction commitments.¹⁹⁴ It also states that Annex 1 parties “are to refrain from” using JI and CDM credits from nuclear facilities to meet their commitments, thus effectively ensuring that nuclear energy projects would not be eligible under these mechanisms.¹⁹⁵ The parties also agreed that forestry projects could be included in the CDM but that these would be limited to: (a) afforestation and reforestation in the first commitment period, with the detailed technical procedures and methodologies governing such projects to be drawn up by one of the subsidiary bodies; and (b) that credits from such forestry projects could constitute no more than one per cent of a Parties’ assigned amount in the first commitment period.¹⁹⁶ With respect to forestry management and other additional land-use, land-use change and forestry (LULUCF) activities under Article 3.4, the contribution of these sinks was subject to individual country caps, set out in an appendix.¹⁹⁷ Agreement was reached on many aspects of the compliance system, including such contentious issues as membership,¹⁹⁸ decision-making procedures,¹⁹⁹ and consequences of non-compliance.²⁰⁰ Consensus could not be achieved, however, on whether the consequences of non-compliance should be binding.²⁰¹

¹⁹³ See *Report of the Conference of the Parties on the Second Part of its Sixth Session*, Part I: Proceedings, paras. 34-38, 45-50, FCCC/CP/2001/5. See also *Summary of the Resumed Sixth Session of the Conference of the Parties to the UN Framework Convention on Climate Change*, 16-27 July 2001 12 (176) EARTH NEGOTIATIONS BULLETIN 4 (2001).

¹⁹⁴ *Report of the Conference of the Parties on the Second Part of its Sixth Session*, *supra* note 193, at 41.

¹⁹⁵ See *id.* at 43.

¹⁹⁶ *Id.* at 43.

¹⁹⁷ *Id.* at 46-47. For instance, the Canada is permitted to count removals of 12 million tonnes of CO₂ (Mt/CO₂) per year in the commitment period, Japan 12 Mt/CO₂, and the Russian Federation 17.63 Mt/CO₂. Some observers maintain that these allowances undermined the environmental integrity of the Protocol. It is interesting to that a footnote at 46 states that: “Consideration was also given to national circumstances (including the degree of effort needed to meet Kyoto commitments and the forest management measures implemented).”

¹⁹⁸ A total of 10 members, with the selection formula resulting in six representatives from non-Annex 1 countries and four from Annex 1. *Report of the Conference of the Parties on the Second Part of its Sixth Session*, *supra* note 193, at 49.

¹⁹⁹ See *id.* at 49. Decisions are to be taken by consensus, failing which a three-quarters majority prevails. For the enforcement branch, Annex 1 parties insisted on double majority voting procedure, so as to avoid the possibility of non-Annex 1 countries colluding against them.

²⁰⁰ See *id.* at 48. The consequences include subtraction of excess emissions times 1.3 from the assigned amount of first commitment period, added to the assigned amount in the next commitment period.

²⁰¹ See *Summary of the Resumed Sixth Session of the Conference of the Parties to the UN Framework Convention on Climate Change*, 16-27 July 2001 12 (176) EARTH NEGOTIATIONS BULLETIN 8(2001).

The issues on which the parties reached detailed agreement essentially related to developing country concerns.²⁰² Most importantly, the parties created three new funds, two under the Convention – the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF)²⁰³ – and one, the Adaptation Fund,²⁰⁴ under the Kyoto Protocol. In something of an innovation, parties decided that the Adaptation Fund would be financed from a two per cent share of proceeds from CDM projects. In a victory for developing countries, agreement was also reached on the creation of an Expert Group on Technology Transfer.²⁰⁵ A decision under Protocol Article 3.14, strongly supported by OPEC countries, requested Annex I Parties to report annually on the steps taken to minimize the adverse effects of their response measures on developing countries.²⁰⁶

COP-7: The “Marrakech Accords” – Hard bargaining

The Seventh Conference of the Parties (COP-7) in Marrakech succeeded in the task of translating the political Bonn Agreement into a legal text.²⁰⁷ Decisions were prepared with respect to: “nuts and bolts” issues such as the rules and procedures applicable to systems and inventories relating to GHG emissions and removals by sinks;²⁰⁸ the compliance regime;²⁰⁹ guidelines and procedures for the implementation of the flexibility mechanisms;²¹⁰ and land-use and forestry as sinks for the removal of GHGs.²¹¹ The more than two hundred pages of text comprising the Marrakech Accords are also known as the “Kyoto rule-book”.

After Marrakech, the Protocol might perhaps have been compared to a new house that – while still requiring a few touch-ups here and there – was essentially

²⁰² At COP-6bis the parties converted the political Bonn Agreement into one set of decisions forwarded to COP-7 for adoption and another requiring further elaboration and completion. See *Report of the Conference of the Parties on the Second Part of its Sixth Session*, respectively, addendum, Part III: Decisions on which the Conference of the Parties noted that negotiations were completed and consensus reached at the Second Part of the Sixth Session and which the Conference decided to forward to its Seventh Session for adoption, FCCC/CP/2001/5/Add.1 (2002), and addendum, Part IV: Draft decisions on which progress was noted by the Conference of the Parties at the second part of its Sixth Session and which the Conference of the Parties decided to forward to its Seventh Session for elaboration, completion and adoption, FCCC/CP/2001/5/Add.2 (2002).

²⁰³ See *Report of the Conference of the Parties on the Second Part of its Sixth Session*, addendum Part III, *supra* note 202, at 44-45.

²⁰⁴ See *id.* at 54.

²⁰⁵ See *id.* at 21.

²⁰⁶ See *id.* at 50. Countries with economies dependent oil exports, particularly some OPEC members, are concerned that mitigation measures under the Protocol may harm their markets.

²⁰⁷ For a summary and overview see *Summary of the Seventh Conference of the Parties to the UN Convention on Climate Change, 29 October to 10 November 2001*, 12 (189) EARTH NEGOTIATIONS BULLETIN (2001)

²⁰⁸ Decisions 20/CP.7, 21/CP.7, 22/CP.7 and 23/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, addendum, Part II: Action taken by the Conference of the Parties, Vol. III, FCCC/CP/2001/13/Add.3 (2002).

²⁰⁹ Decision 24/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, *supra* note 208.

²¹⁰ See decisions 15/CP.7, 16/CP.7, 17/CP.7, 18/CP.7, 19/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, addendum, Part II: Action taken by the Conference of the Parties, Vol. II, FCCC/CP/2001/13/Add.2 (2002).

²¹¹ See decisions 11/CP.7 and 12/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, addendum, Part II: Action taken by the Conference of the Parties, FCCC/CP/2001/13/Add.1 (2002).

ready to be occupied. The cost in environmental integrity of “getting the job done” in Bonn and Marrakech could be judged as too high.²¹² The main count in this indictment relates to role played by sinks, particularly the fact that the verification of GHGs through forestry management and other land-use measures is very loose.²¹³ With the United States having pulled out, another group of countries – Canada, Japan, and the Russian Federation – assumed a degree of veto power with respect to the final details of the Marrakech negotiations, and they were able to extract a number of concessions from the EU.²¹⁴

The combination of fungibility²¹⁵ of allowances and credits under the Protocol and “banking”²¹⁶ has the potential of watering down the environmental integrity of the Protocol.²¹⁷ (Parties with surplus allowances and credits in the first commitment period may “bank” them for subsequent commitment periods.) Particularly problematic may be the units derived from sinks projects in Annex 1 countries under Protocol Article 3(3)-(4). Although these removals units (RMUs) cannot themselves be banked or carried over, their interchangeability or fungibility with other Kyoto units means that an Annex 1 party could simply surrender RMUs for compliance purposes in the first commitment period, retaining surplus assigned amount units (AAUs), certified emission reductions (CERs), and emission reduction units (ERUs) to carry over into the next commitment period.²¹⁸

Careless engagement in international emissions trading, and to a lesser extent JI projects, raised the possibility that Annex 1 parties could find themselves short of allowances at the end of the commitment period. In order to mitigate the risk of

²¹² See analysis of “Kyoto loopholes” by BILL HARE & MALTE MEINSHAUSEN, GREENPEACE INTERNATIONAL, BACKGROUND INFORMATION ON POTENTIAL LOOPHOLES IN THE KYOTO PROTOCOL, UPDATE FOR COP-6 (PART TWO), BONN, (2001).

²¹³ For instance, while parties must demonstrate that removals from cropland management, forestry management and similar activities are human induced, there is no requirement for the submission of annual inventories, as there is for sources of GHG emissions and removals by sinks in the case of afforestation and deforestation. This undermines the rigor and environmental integrity of the exercise. See decision 11/CP.7, annex, para. 8. And while sinks from forestry management are capped by country, no such limit applies to the other land-use measures mentioned above. With respect to rewards of hard bargaining, the concession obtained by the Russian Federation is particularly striking – it was able to double the amount of removals from forestry management it could count towards its target, up from 17 Mt/CO₂ to 33 Mt/CO₂ per year times five.

²¹⁴ See *Summary of the Seventh Conference of the Parties to the UN Convention on Climate Change, 29 October to 10 November 2001*, 12 (189) EARTH NEGOTIATIONS BULLETIN 15-16 (2001). See also DESSAI, *supra* note 184, at 14-17.

²¹⁵ See decision 18/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, *supra* note 210, annex, paras. 11-12.

²¹⁶ Banking refers to the possibility of retaining unused AAUs from one commitment period for use in a subsequent commitment period. See *id.* annex, paras. 15-16.

²¹⁷ There is no limit on the number of AAUs that may be banked or carried over. For CERs and ERUs, respectively, a party may not bank an amount greater than 2.5 per cent of its initial assigned amount under Article 3(7)-(8) of the Protocol.

²¹⁸ In theory banking introduces flexibility and improves the economic efficiency of a cap-and-trade mechanism, helping to overcome the limitations of fixed and rather short commitment periods. However, with the potential of large numbers of forestry and land-use RMUs entering the system, allowing Annex 1 countries to bank AAUs, it is possible that new comers in a second commitment period will be disadvantaged. Under a tighter cap, new entrants will not have the buffer of easily acquired, banked credits of some Annex 1 parties.

overselling by Annex 1 parties, it was decided that they would be required to maintain a commitment period reserve (CPR), which is an amount equal to 90 per cent of its initial assigned amount or five times its most recently reviewed emissions inventory, whichever is lowest.²¹⁹

COP-8: Focus on Adaptation in New Delhi

With the technical details of the Kyoto flexibility mechanism in place, the Eighth Conference of the Parties (COP-8), held in New Delhi, saw the concerns of developing countries take center stage.²²⁰ Prominent among them was adaptation – of immediate concern to developing countries – but an issue that has generally played second fiddle to mitigation in the climate negotiations.²²¹ The parties adopted the Delhi Declaration on Climate Change and Sustainable Development, which reaffirms that development and poverty eradication are the overwhelming priorities of developing countries.²²² It emphasizes that climate change should be addressed while meeting the requirements of sustainable development, as well as the need to integrate measures to combat climate change into national development programs. It stresses the importance of adaptation to the impacts of climate change for all countries, noting that developing countries are particularly vulnerable, and calls on industrialized countries to further implement their commitments relating to financing, capacity building and technology transfer. With COP-8 taking place little more than a month after the World Summit on Sustainable Development, it is unsurprising that the Declaration borrows language from the Plan of Implementation calling for diversifying energy supplies, as well as actions to substantially increase the global share of renewable energy sources.²²³

COP-9: Milan

The uncertain fate of the Kyoto Protocol hung over the discussions at the Ninth Conference of the Parties (COP-9), held in Milan in December 2003.²²⁴ Entry into force was conditional on the ratification of the Russian Federation, which sent mixed but largely negative signals on this point.²²⁵ Nevertheless, the parties adopted

²¹⁹ See decision 18/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, *supra* note 210, annex, para. 6.

²²⁰ For an account of the negotiations, see *Summary of the Eighth Conference of the Parties to the UN Convention on Climate Change, 23 October to 1 November 2002*, 12 (209) EARTH NEGOTIATIONS BULLETIN (2002).

²²¹ Andrew C. Revkin, *Climate Talks Shift Focus to How to Deal With Changes*, N.Y. TIMES, November 3, 2002.

²²² *Report of the Conference of the Parties on its Eighth Session*, addendum, Part II: Action taken by the Conference of the Parties, 3, FCCC/CP/2002/7/Add.1 (2002).

²²³ See Plan of Implementation of the World Summit on Sustainable Development, para. 20(e), *Report of the World Summit on Sustainable Development*, U.N. Doc. A/Conf./199/20. The Plan of Implementation is accessible at http://www.un.org/esa/sustdev/documents/docs_key_conferences.htm.

²²⁴ For an account of the negotiations see *Summary of the Ninth Conference of the Parties to the UN Convention on Climate Change, 1 to 12 December 2003*, 12 (233) EARTH NEGOTIATIONS BULLETIN (2003). See also SURAJE DESSAI ET AL, CHALLENGES AND OUTCOMES AT COP-9 (Tyndall Centre Briefing Note No. 11, 2004).

²²⁵ Steven Lee Myers & Andrew C. Revkin, *Russia to Reject Pact on Climate Putin Aide Says*, N.Y. TIMES, December 3, 2003.

an important decision operationalizing the Special Climate Change Fund (SCCF). The decision provides that that adaptation will enjoy priority in allocation of resources, and that technology transfer and associated capacity building will also be covered.²²⁶ Supported adaptation activities will fall in a range of areas such as water resources management, agriculture, integrated coastal zone management, monitoring of vector-borne diseases and coping with disasters caused by extreme weather events. A sticking point in the negotiations was how funds under the SCCF would be used to support the economic diversification of countries with economies dependent on oil exports,²²⁷ which was an issue because the initial decision establishing the Fund provided that diversification activities would be covered.²²⁸ Supported by provisions in the Convention and the Kyoto Protocol referring to the adverse impact of response (mitigation) measures, oil producing developing countries have advocated for assistance to enable their economies to diversify beyond hydrocarbon exports.²²⁹ In this context, oil-producing countries allege the adverse impacts resulting from carbon taxes and similar mitigation measures aimed at fossil fuels.

The parties also adopted guidelines for the operation of the LDC Fund, which is designed to provide assistance to least developed countries.²³⁰ In the first instance, the Fund would be tapped to support the preparation of national adaptation programmes of action (NAPAs), identifying immediate and urgent adaptation needs. Finally, in adopting the technical rules for afforestation and deforestation projects under the CDM, the Milan meeting completed the last item on the Buenos Aires Plan of Action.²³¹

COP-10: Buenos Aires

The Russian Federation's decision to ratify the Protocol,²³² taken shortly before the Tenth Conference of the Parties (COP-10), reinvigorated the negotiations. A major outcome of this meeting was the adoption of the Buenos Aires Programme of Work on Adaptation and Response Measures. It covers the following areas: adverse effects of climate change; impact of the implementation of response

²²⁶ Decision 5/CP.9, in *Report of the Conference of the Parties on its Ninth Session*, addendum, Part II: Action taken by the Conference of the Parties, Vol. I, 11-12, FCCC/CP/2003/6/Add.1 (2004).

²²⁷ EU countries argued that the inclusion of diversification for oil exporters would preclude them making substantial contributions to the Fund. The issue was deferred for further consideration at COP-10, following inputs by the parties. See DESSAI ET AL, *supra* note 224.

²²⁸ See decision 7/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, addendum, Part II: Action taken by the Conference of the Parties, Vol. I, para. 2(d), FCCC/CP/2001/13/Add.1 (2002). This provision represented a considerable victory for the OPEC countries, building on Protocol Article 4(8)(h) that situates the potential negative economic impacts of mitigation measures with the adverse impacts of climate change on developing countries.

²²⁹ See UNFCCC, art. 4(8)(h) and Protocol art. 2(3) and art 3(14).

²³⁰ Decision 6/CP.9, in *Report of the Conference of the Parties on its Ninth Session, Part two: Action taken by the Conference of the Parties at its Ninth Session*, *supra* note 226, at 13.

²³¹ Decision 19/CP.9, in *Report of the Conference of the Parties on its Ninth Session*, addendum, Part II: Action taken by the Conference of the Parties, Vol. II, 13, FCCC/CP/2003/6/Add.2 (2004). The decision addresses complex issues relating to the permanence of sinks by providing for two types of CERs: a temporary CER (tCER), which expires five years after its issue and a long-term CER (lCER), which expires at the end of the crediting period of the project activity.

²³² Seth Mydans & Andrew C. Revkin, *With Russia's Nod, Treaty in Emissions Clears Last Hurdle*, N.Y. TIMES, October 1, 2004.

measures; and a request to the Subsidiary Body for Technological and Scientific Advice (SBSTA) to develop a structured five-year program of work on the scientific, technical and socio-economic aspects of impacts, vulnerability and adaptation to climate change.²³³

The discussions on support for adaptation activities were again complicated by the coupling of impacts from climate change with the impacts of response measures, because under this agenda item certain oil producing States, argued that assistance under the GEF should be made available for activities such as economic diversification.²³⁴ Donor countries resisted this linkage and equivalence. The EU announced that donors had pledged over US\$ 30 million for the Special Climate Change Fund (SCCF).²³⁵ During discussions on additional guidelines for the SCCF and the LDC Fund developing countries reiterated their complaints concerning the difficulty in accessing funds under the GEF, which had been designated as the entity to manage both these funds.

Other decisions taken by the parties concerned the adoption of simplified modalities and procedures for small-scale afforestation and reforestation CDM projects,²³⁶ seen as facilitating community-level CDM projects in developing countries,²³⁷ as well as further guidelines for quality assurance of the international transactions log (ITL), the software and technical backbone of international emissions trading under the Protocol.²³⁸ The ITL is designed to verify that transactions involving allowances and other units are consistent with rules agreed under the Kyoto Protocol.

With the Protocol's entry into force assured, negotiators also turned some of their attention to the issue of the future direction of the climate regime, bearing in mind the expiry in 2012 of the first commitment period under the Protocol. A rather unthreatening proposal by the EU to hold two seminars was rebuffed, and it was only at the last minute agreement was reached on one seminar.²³⁹

COP-11: Breakthrough in Montreal

Since the Protocol had entered into force in February 2006, the eleventh Conference of the Parties (COP-11) was held together with the first Conference of

²³³ Decision 1/CP.10, *Report of the Conference of the Parties on its Tenth Session*, addendum, Part II: Action taken by the Conference of the Parties, Vol. I, FCCC/CP/2004/10/Add.1 (2005).

²³⁴ Hermann E. Ott et al, *It Takes Two to Tango – Climate Policy at COP 10 in Buenos Aires and Beyond*, J. FOR EUROP. ENV. & PLANNING L.84, 86 (2005).

²³⁵ *Summary of the Tenth Conference of the Parties to the UN Convention on Climate Change*, 6 -18 December 2004, 12 (260) EARTH NEGOTIATIONS BULLETIN 9 (2004).

²³⁶ Decision 3/CP.10, in *Report of the Conference of the Parties on its Tenth Session*, addendum, Part II: Action taken by the Conference of the Parties, Vol. II, FCCC/CP/2004/10/Add.2 (2005).

²³⁷ E.g. the BioCarbon Fund of the World Bank, <http://carbonfinance.org/Router.cfm?Page=BioCF&ItemID=9708&FID=9708>.

²³⁸ Decision 16/CP.10, in *Report of the Conference of the Parties on its Tenth Session*, *supra* note 236.

²³⁹ As expected this discussions proved difficult and the results were meager, with the parties only able to agree on a seminar for an informal exchange of views, subject to the express condition that it would not “open any negotiations leading to new commitments”. See *Report of the Conference of the Parties on its Tenth Session*, Part I: Proceedings, 37, FCCC/CP/2004/10 (2005). Strong opposition came from the United States. See Larry Rohter, *U.S. Waters Down Global Commitment to Curb Greenhouse Gases*, N.Y. TIMES, December 19, 2004. For analysis, see also Ott et al, *supra* note 234, at 85.

the Parties serving as the Meeting of the Parties (COP/MOP-1) to the Kyoto Protocol.²⁴⁰ The Montreal meeting was historic on several counts. The first meeting of the supreme body of the Kyoto Protocol, the COP/MOP, formally adopted the draft decisions that constituted the rulebook agreed on in the Marrakech Accords and subsequent COPs.²⁴¹ The meeting also launched two parallel processes or “tracks” addressing the future next stage in the climate regime. Under the Protocol, parties initiated the mandated review of the commitments of Annex 1 parties by establishing the Ad Hoc Working Group (AWG) to negotiate industrialized parties’ commitments for the post-2012 period. Under the Convention, parties agreed to establish a non-negotiating “dialogue on long-term cooperative action” to address climate change.

The review of Annex 1 commitments was triggered by Article 3.9 of the Protocol, which requires that the COP/MOP shall initiate the consideration of Annex 1 commitments at least seven years before the end of the first commitment period, in other words by 2005. The mandate of this review covered only industrialized (Annex 1) parties. Developing countries proposed that negotiations on the second commitment period should conclude in 2008, and argued that it was incumbent on industrialized countries to demonstrate leadership on mitigation. For their part, Annex 1 parties – now excluding the United States, which as a non-party was relegated to an observer role – resisted the establishment of a timeline. Eventually parties settled on less specific language stating that the negotiations in the Ad Hoc Working Group (AWG) on Annex 1 commitments should be completed in time to ensure that there is no gap between the first and second commitment periods.²⁴² Some industrialized country parties attempted to link the above process with the broader review of the Protocol provided for under Article 9.²⁴³ This review of the adequacy of the Protocol would also apply to developing countries. Article 9 states that the parties “shall periodically review this Protocol in the light of the best scientific information and assessments on climate change and its impacts”, with the first review required at COP-12/MOP-2 in 2006. As a negotiating tactic, establishing a linkage between the two processes presented an opportunity to bring pressure to bear on certain developing countries; however, in legal terms the Article 9 review is intended to be a separate process, based on a thorough review of the latest science, as well as technical and economic information.

As noted above, the second “track” begun in Montreal consisted of a dialogue under the Convention. What it lacked in ambition, it partially compensated for in terms of inclusiveness, both in relation to the issues (adaptation and mitigation) and with respect to parties. For those taking the longer view, the dialogue could be regarded as the first tenuous toehold in a process leading towards greater

²⁴⁰ For an analysis of the meeting, see Hermann E. Ott et al, *The Montreal Climate Summit: Starting the Kyoto Business and Preparing for post-2012*, J. FOR EUROP. ENV. & PLANNING L. 90 (2006).

²⁴¹ At total of nineteen draft decisions were recommended for adoption by the COP/MOP at its first session, as contained in the reports of COP 7, COP 8, COP 9 and COP 10. See *Compendium of draft decisions forwarded for adoption by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its first session, Note by the Secretariat*, para. 2, FCCC/KP/CMP/2005/3.

²⁴² Given the time required to complete the requisite ratifications, an agreement probably needs to be reached by 2009.

²⁴³ Ott et al, *supra* note 240, at 91.

involvement of developing countries and those outside the Kyoto process, Australia and the United States. However, the latter was adamant that any new process – in fact carefully labeled as a “dialogue – should in no way lead to new commitments.”²⁴⁴ Thus the parties explicitly resolved that the dialogue would consist of an “open and non-binding exchange of views” and would “not open any negotiations leading to new commitments.”²⁴⁵

Among other things, the decision on the dialogue on long-term cooperative action to address climate change reaffirms that development and poverty eradication are the first and overriding priorities of developing country parties, recognizes the diversity of approaches to address climate change, and emphasizes the essential role of technology in addressing climate change.²⁴⁶ The parties agreed that the dialogue would be structured as four workshops covering the following topics: advancing development goals in a sustainable way; addressing action on adaptation; realizing the full potential of technology; and realizing the full potential of market-based opportunities.

The adoption of the decision on the compliance mechanism gave rise to considerable discussion.²⁴⁷ Article 18 of the Protocol states that “[a]ny procedures and mechanisms under this Article entailing binding consequences shall be adopted by means of an amendment to this Protocol”. In the Marrakech Accords, the legal status of the compliance mechanism as well as its consequences was left open, and referred to COP/MOP in the following terms: “it is the prerogative of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol to decide on the legal form of the procedures and mechanisms relating to compliance”.²⁴⁸ At the risk of some uncertainty about its exact legal status, both developing and industrialized countries preferred adopting the compliance regime in the form²⁴⁹ of a decision of the COP/MOP. An amendment to the Protocol, as proposed by Saudi Arabia,²⁵⁰ raised the possibility of two categories of parties to the Protocol, namely those who had ratified the amendment and those who had not, with associated legal uncertainty.²⁵¹

While the climate negotiations have, from their inception, attracted attention from the business community and environmental negotiations, the Montreal conference will be remembered for manner in which one part of the business lobby pressed for a clear signal on the future of the climate regime. The representatives of the carbon finance industry – consultants, investors, lawyers, project developers –

²⁴⁴ See *id.* at 92. See also *Summary of the Eleventh Conference of the Parties to the UN Convention on Climate Change, 28 November – 10 December 2005*, 12 (291) EARTH NEGOTIATIONS BULLETIN 14 (2005).

²⁴⁵ FCCC/CP/2005/5/Add.1, *Report of the Conference of the Parties on its eleventh session, Part Two: Action taken by the Conference of the Parties at its eleventh session*, 3 (2006).

²⁴⁶ *Report of the Conference of the Parties on its eleventh session, addendum, Part II: Action taken by the Conference of the Parties*, 3-4, FCCC/CP/2005/5/Add.1 (2006).

²⁴⁷ Ott et al, *supra* note 240, at 94.

²⁴⁸ Decision 24/CP.7, in *Report of the Conference of the Parties on its Seventh Session, addendum, Part II: Action taken by the Conference of the Parties*, Vol. III, FCCC/CP/2001/13/Add.3 (2002).

²⁴⁹ The implications are analyzed by Ulfstein & Werksman, *supra* note 136, at 58-58.

²⁵⁰ *Proposal from Saudi Arabia to amend the Protocol, Note by the secretariat*, FCCC/KP/CMP/2005/2 (2005).

²⁵¹ *Summary of the Eleventh Conference of the Parties to the UN Convention on Climate Change, 28 November – 10 December 2005*, 12 (291) EARTH NEGOTIATIONS BULLETIN 14 (2005).

now have a great deal at stake in the continuation of the Kyoto flexibility mechanisms. It is clear that this interest group will represent a significant new private sector voice in the evolution and development of the climate regime.

COP-12 – Nairobi: The African Adaptation COP

This part summarizes the discussions and main outcomes of twelfth Conference of the Parties to the United Nations Framework Convention on Climate Change and the second Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (COP/MOP-2).²⁵² As the first COP to be held in sub-Saharan Africa, the Nairobi Conference was naturally expected to advance the adaptation agenda. As it turned out, progress was made on the establishment of the Adaptation Fund and the work program of the Subsidiary Body on Scientific and Technological Advice (SBSTA) on impacts, vulnerability and adaptation.

The Ad Hoc Working Group (AWG) on Annex 1 commitments held its second session at COP-12, agreeing that future work would proceed under three headings: analysis of mitigation potential and ranges of emission reduction objectives; analysis of possible means to achieve mitigation objectives; and consideration of further commitments. The first review of the Protocol, mandated by Article 9(2), proved to be a contentious issue that kept negotiators occupied quite late into the final days of the meeting. Developing countries, particularly the African group and China advocated concluding the review “at” the meeting – while the EU wanted to launch a review process. Developing countries also supported scheduling the second review in four to five years.²⁵³ Not coincidentally perhaps the second review would then take place safely after the date – generally assumed to be 2009 – by when targets for the second Kyoto commitment period would have had to be agreed. In the end, developing countries obtained language that the review would not lead to new commitments, while in return industrialized countries prevailed on the timing of the second review, which was set for COP-14 in 2008.²⁵⁴ The Russian proposal to amend the Protocol to allow for voluntary commitments by non-Annex 1 again kept negotiators busy until the final hours of the conference.²⁵⁵ The proposal as it stands is not readily compatible with the structure of the Protocol. It would, for instance, enable those developing countries assuming “voluntary commitments” to participate in all the Protocol’s flexibility mechanisms, including international emissions trading, the latter of course being predicated emission limitation and reduction targets. In short, the mechanisms designed to assist Annex 1 parties meet their binding targets would be extended to other parties assuming “voluntary

²⁵² The author attended the second week of the meeting (15-17 November 2006) in an observer capacity. For an account of discussions and decisions at the Nairobi conference, see *Summary of the Twelfth Conference of the Parties to the UN Convention on Climate Change and Second Meeting of the Parties to the Kyoto Protocol, 6-17 November, 12 (318) EARTH NEGOTIATIONS BULLETIN (2006)*.

²⁵³ See *id.* at 7.

²⁵⁴ Decision 7/CMP.2, in *Report of the Conference of the Parties serving as the meeting of the Parties on its Second Session*, addendum, Part II: Action taken by the Conference of the Parties serving as the meeting of the Parties, FCCC/KP/CMP/2006/10/Add.1 (2007).

²⁵⁵ As a compromise, parties requested the President of the COP to hold a workshop in May 2007 to explore the scope and implications of the proposal. See *Report of the Conference of the Parties serving as the meeting of the Parties on its Second Session*, Part I: Proceedings, paras. 134-136, FCCC/KP/CMP/2006/10 (2007).

commitments”.²⁵⁶ Finally, under the Convention track, the second workshop of the Convention dialogue on long-term cooperative action addressed the topics of advancing development goals in a sustainable way and realizing the full potential of market-based opportunities.²⁵⁷

The COP/MOP took an important step forward by defining the principles and modalities governing the administration of the Adaptation Fund.²⁵⁸ Notably, the governing body will have a majority of members from developing countries (non-Annex 1) and follow a one-country-one vote rule, differentiating it from the “double majority” of the other funds under the GEF voting system.²⁵⁹ The Adaptation Fund (AF) is unique in a number of respects. First, unlike the other funds it is solely the creature of the parties to the Protocol, outside the direct influence of United States, with negotiations led by the EU.²⁶⁰ Second, unlike the other funds - which are financed from voluntary contributions and hence dependent on solidarity - revenue for the AF will be derived from a two per cent levy on emissions credits under the CDM.²⁶¹ The levy is projected to generate between \$160 and \$950 million for the Fund, dwarfing the \$170 million that has been deposited or pledged for the LDC and the Special Climate Change Funds.²⁶² Third, the parties also decided that the AF “should operate under the authority and guidance of and be accountable” to COP/MOP, which will decide on its overall policies. It is legally and politically significant that the AF will operate not only under the guidance of the COP/MOP, but also under its authority. The reason is that with respect to the other climate change funds operated by the GEF, the COP provides “guidance”; effective authority rests with the GEF council, in practice dominated by donor countries. For developing countries, many of which have chafed under what they view as the excessively bureaucratic and onerous procedures of the GEF, the decision on the Adaptation Fund, particularly the voting procedure, was rightly hailed as major victory.

The Subsidiary Body on Scientific and Technological and Advice (SBSTA) adopted decisions concerning its “Five year program of work on impacts, vulnerability and adaptation to climate change”, which consists of activities

²⁵⁶ *Report of the President on consultations concerning the proposal of the Russian Federation to develop appropriate procedures for the approval of voluntary commitments, Submission from a Party*, 9 FCCC/KP/CMP/2006/MISC.4 (2006).

²⁵⁷ Copies of presentations are available on the UNFCCC secretariat website at <http://unfccc.int/meetings/dialogue/items/3759.php>.

²⁵⁸ Decision 5/CMP.2, in *Report of the Conference of the Parties serving as the meeting of the Parties on its Second Session*, *supra* note 254.

²⁵⁹ There are legal questions how the voting procedure for the Fund will operate within the GEF's governance system. The GEF maintained that the hybrid formula of the GEF was flexible enough to accommodate the unique features of the Fund, including the fact that CERs, which will finance the Fund, originate from projects in developing countries. Additionally, a legal opinion from the World Bank, which is the trustee of the GEF funds, indicated that the unique aspects of the Adaptation Fund would be compatible with GEF procedures. See GEF, GOVERNANCE OF THE GLOBAL CLIMATE CHANGE FUNDS, GEF/C.29/5, para. 11 (2006).

²⁶⁰ BENITO MUÉLLER, OXFORD INSTITUTE FOR ENERGY STUDIES, NAIROBI 2006: TRUST AND THE FUTURE OF ADAPTATION FUNDING, 3 (2007), available at <http://www.oxfordenergy.org/>.

²⁶¹ Decision 17/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, *supra* note 120, at para. 15(a)-(b). CDM projects in least developed countries are exempt from the levy.

²⁶² MUÉLLER, *supra* note 260, at 3.

(workshops, technical papers, submissions, etc) to help countries make informed decisions on practical actions and measures.²⁶³ As could be expected, the G-77 and China focused on a learning-by-doing approach and actual projects, while United States led the argument for an approach based on assessment and research.²⁶⁴ The adoption of the work program marked the achievement of one concrete goal established in the Buenos Aires program of work on adaptation, adopted in 2004 at COP-10. A range of other decisions addressed guidance to the GEF for the operation of the Special Climate Change Fund under the Convention;²⁶⁵ guidance to the Executive Board of the CDM, where disagreement surfaced among the parties with respect to the eligibility of carbon dioxide capture and storage projects;²⁶⁶ and adopted the rules of procedure for the body responsible for supervising certain Joint Implementation (JI) projects.²⁶⁷ On the issue of emissions from deforestation, Brazil submitted a proposal for an international fund to finance activities to reduce the rate of deforestation in developing countries.²⁶⁸ This came after Papua New Guinea, supported by other tropical rainforest nations, had placed the issue of incentives for avoided deforestation on the Convention agenda at COP-11 in Montreal.²⁶⁹

In sum, COP-12 did not deliver any breakthroughs, but nor was it expected to do so. This was not necessarily the view taken by the media, which perhaps found it difficult to reconcile the self-contained negotiating process - its set timelines and stylized group positions – with the greater urgency of climate change in the public debate.

COP-13 – Down to the wire in Bali

In the year leading up the Bali conference, a number of meetings contributed to setting a tone of urgency with respect to climate change. In April, the Security Council, under the rotating presidency of the United Kingdom, convened its first

²⁶³ *Report of the Subsidiary Body for Scientific and Technological Advice on its twenty-fifth session*, paras. 11-71, FCCC/SBSTA/2006/11 (2007).

²⁶⁴ *Summary of the Twelfth Conference of the Parties to the UN Convention on Climate Change and Second Meeting of the Parties to the Kyoto Protocol, 6-17 November, 12* (318) EARTH NEGOTIATIONS BULLETIN 7 (2006).

²⁶⁵ Decision 1/CP.12, in *Report of the Conference of the Parties on its Twelfth Session*, addendum, Part II: Action taken by the Conference of the Parties, FCCC/CP/2006/5/Add.1 (2007).

²⁶⁶ See decision 1/CMP.2, in *Report of the Conference of the Parties serving as the meeting of the Parties on its Second Session*, *supra* note 254. The decision requests the CDM Executive Board to continue consideration of new carbon capture and storage (CCS) methodologies under the CDM, but with approval subject to further guidance from the COP/MOP, with a decision to be made at COP/MOP-4 in 2008. As the (extended) registration date for CDM projects is 31 March 2007, CCS projects will not be included under the CDM for in the first commitment period.

²⁶⁷ Decision 2/CMP.2, in *Report of the Conference of the Parties serving as the meeting of the Parties on its Second Session*, *supra* note 254.

²⁶⁸ Brazil's proposal envisages "positive incentives" for a net reduction of emissions from deforestation, with funding to come from industrialized countries. See *Positive incentives for voluntary action in developing countries to address climate change: Brazilian perspective on reducing emissions from deforestation*, Submission from Brazil, Dialogue Working Paper 21, available at http://unfccc.int/files/meetings/dialogue/application/pdf/wp_21_braz.pdf. The proposal stops well short of embracing the concept of avoided deforestation as such. Rather, the proposal is aimed at the reduction of emissions from deforestation.

²⁶⁹ See *Reducing emissions from deforestation in developing countries: approaches to stimulate action*, Submissions from Parties, FCCC/CP/2005/MISC.1 (2005).

ever debate on climate change.²⁷⁰ In June, under the German presidency, the G-8 countries adopted a summit document pledging to “seriously consider” deep cuts in emissions in their developing countries, but only after prolonged opposition by the U.S.²⁷¹ At the United Nations, the General Assembly convened a thematic debate on climate change, which saw an almost exhaustive speakers list of countries address the topic.²⁷² At this meeting, as before, the E.U reiterated its position of a 20 per cent cut by 2020, to be deepened to 30 per cent, if other major actors committed to serious mitigation action. Likewise, the statements of certain developing countries, such as Brazil and South Africa, hinted that they would approach Bali with a mandate to begin negotiations. In early September, the Asia Pacific Cooperation Summit (APEC), hosted by Australia, countries adopted a final declaration pledging to work constructively towards a successful meeting in Bali, and they also agreed to “work to achieve a common understanding on a long-term aspirational global emissions reduction goal to pave the way for an effective post-2012 international arrangement.”²⁷³

On 24 September, the United Nations Secretary-General convened a one-day high-level event on climate change, which was organized around the four themes of adaptation, mitigation, technology and finance, and which drew the participation of almost 80 heads of state or government.²⁷⁴ Although a forum for discussion, not negotiation, the meeting did generate momentum going forward to Bali, with participants highlighting the need for action on climate change.²⁷⁵ Later that same week, the U.S. convened a its first meeting in a planned series of meetings of major economies on energy security and climate change, which brought together eighteen major economies, as well as the EU and the United Nations.²⁷⁶ The stated aim of this initiative, quickly dubbed the “major emitters” meeting, is to arrive at a long-term (non-binding) goal among the major economies and establish nationally defined goals and programs for improving energy security and reducing greenhouse gas emissions. The emphasis on voluntary action, as opposed to binding targets, seems to have dampened participants’ enthusiasm for the meeting.²⁷⁷

The Bali Conference – formally the Thirteenth Session of the Conference of the Parties to the UN Framework Convention on Climate Change (COP-13) and the Third Session of the Meeting of the Parties to the Kyoto Protocol (COP/MOP-3) – saw governments make progress on several important agenda items, but the dominant issue was the expectation that the meeting would launch negotiations on a

²⁷⁰ See Reuters, *U.N. Council Hits Impasse Over Climate Change*, N.Y. TIMES, April 17, 2007. U.N. S.C., 5663rd mtg., U.N. Doc. S/PV.5663 and S/PV.5663 (Resumption 1) (2007).

²⁷¹ See *Growth and Responsibility in the World Economy*, Summit Declaration, June 7, para. 49, adopted at the G-8 Summit, Heiligendamm, <http://www.g-8.de/Webs/G8/EN/G8Summit/SummitDocuments/summit-documents.html>.

²⁷² See for details of speakers and statements <http://www.un.org/ga/president/61/follow-up/thematic-climate.shtml>.

²⁷³ See http://www.apec.org/apec/leaders_declarations/2007/aelm_climatechange.html.

²⁷⁴ Warren Hoge, *U.N. Chief Urges Fast Action on Climate Change*, N.Y. TIMES, September 25, 2007.

²⁷⁵ See <http://www.un.org/climatechange/2007highlevel/summary.shtml>.

²⁷⁶ *Invitation to Meeting of Major Economies on Energy Security and Climate Change*, Letter from President George W. Bush, August 2, 2007, <http://www.whitehouse.gov/news/releases/2007/08/20070803-7.html>. See also details on the initiative at <http://www.state.gov/g/oes/climate/mem/>.

²⁷⁷ John M. Broder, *At Climate Meeting, Bush Does Not Specify Goals*, N.Y. TIMES, September 29, 2007.

future agreement. The release of the IPCC's Fourth Assessment Report strengthened the scientific case for action, and media and public interest in climate change reached a new level with the joint award of the Nobel Peace Prize to Albert Gore and the IPCC. A full day after the scheduled close, and after high-profile pleas for flexibility from the United Nations Secretary-General and the President of Indonesia, the Bali conference concluded with agreement on launching negotiations on future actions to mitigate greenhouse gases emissions.²⁷⁸ At the heart of the "Bali roadmap" – in fact a collection of decisions – is the much-expected and politically crucial agreement to launch a new process for negotiations on "long-term cooperative action" beyond 2012.

As noted above, at the Montreal conference in 2005, parties launched two parallel processes – or "tracks" – to begin addressing the post-2012 action. The first, the Ad hoc Working Group (AWG), was established under article 3.9 of the Protocol, with the aim of elaborating for Annex 1 countries only, for the second, post-2012 commitment period. The second track, the Dialogue on long-term cooperative action – explicitly not a forum for negotiations – concluded with its last workshop in August 2007. In their report to the Bali conference, the co-facilitators of the Dialogue outlined four options for the future, ranging from an extension of the Dialogue to a fully integrated negotiating process under both the UNFCCC and Protocol. The key outcome was the Bali Action Plan launching a negotiating process, the Ad Hoc Group on Long-term Cooperative Action, which will proceed in parallel with the Kyoto negotiations, with the expectation that the two tracks will converge, resulting in a comprehensive post-2012 agreement in 2009.

The two critical issues in the negotiations on the Bali Action Plan were whether to reference an IPCC scenario under which developed country emissions would fall 20-40 per cent below 1990 levels by 2020, and degree to which the paragraphs on developed and developing countries resembled each other in terms of level of implied mitigation effort.²⁷⁹ The figures, especially cuts proposed by 2020, were strongly opposed by the U.S., which argued that settling on numbers at the outset of the meeting amounted to prejudging the outcome of the process.²⁸⁰ The

²⁷⁸ *Some like it cool*, THE ECONOMIST, 10, December 22, 2007, at 10; Thomas Fuller & Andrew Revkin, *Climate Plan Looks Beyond Bush's Tenure*, N.Y. TIMES, December 16, 2007. For accounts of the negotiations and summaries of key outcomes, see: *Summary of the Thirteenth Conference of the Parties to the UN Convention on Climate Change and Third Meeting of the Parties to the Kyoto Protocol, 3-15 December, 12 (354) EARTH NEGOTIATIONS BULLETIN* (2007); Summary prepared by the Pew Center on Global Climate Change, *Thirteenth Conference of the Parties to the UN Convention on Climate Change and Third Meeting of the Parties to the Kyoto Protocol, 3-15 December* (undated), <http://www.pewclimate.org/docUploads/Pew%20Center%20COP%2013%20Summary.pdf>; Robert N. Stavins & Joseph Aldy, *Bali Climate Change Conference: Key Takeaways*, Harvard Project on International Climate Agreements, December 18, 2007, http://belfercenter.ksg.harvard.edu/publication/17781/bali_climate_change_conference.html; Dan Bodansky, *Bali High?*, OPINIO JURIS, weblog, entry posted 19 December 2007, <http://www.opiniojuris.org/posts/1198075277.shtml>; BENITO MÜLLER, OXFORD INSTITUTE FOR ENERGY STUDIES, *BALI 2007: ON THE ROAD AGAIN* (2007), <http://www.oxfordclimatepolicy.org/publications/mueller.html>.

²⁷⁹ Bodansky, *supra* note 278.

²⁸⁰ Pew Center on Global Climate Change, *supra* note 278, at 3.

paragraphs of the mandate relating to developed and developing countries are worth quoting in full, in order to illustrate the nuances.²⁸¹

“(b) Enhanced national/international action on mitigation of climate change, including, inter alia, consideration of:

- (i) Measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives, by all developed country Parties, while ensuring the comparability of efforts among them, taking into account differences in their national circumstances;
- (ii) Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner;”

The mandate retains, but softens, the differentiation between developed (“mitigation commitments or actions”) and developing countries (“actions”), and for this reason marks an important step forward. (Without some willingness to introduce consideration of mitigation in developing countries, the Bali outcome – and any eventual agreement – would certainly have faced rejection by the U.S.) In contrast, the Berlin Mandate, which in 1995 launched the negotiations leading to the Kyoto Protocol, explicitly ruled out any commitments for developing countries. Even a cursory reading, however, reveals that the negotiators, led by the U.S., managed to introduce considerable leeway and flexibility. To begin, the chapeau calls for enhanced “national/international” action – satisfying the interests of parties, like the U.S., that prefer national actions over internationally mandated targets. Second, the chapeau calls for “consideration”, not negotiation, of the commitments and actions referenced in paragraphs (b)(i) and (b)(ii).

It is worth noting that the developed country paragraph - para. (b)(i) - lists actions as an alternative to commitments, and emission targets are referred as “objectives”, rather than “commitments”, as in an earlier draft.²⁸² Further scope for differentiation is introduced by the words “nationally appropriate” as a qualifier for “actions and commitments”. As regards the developing country paragraph, the phrase “in a measurable, reportable and verifiable manner” qualifies both mitigation actions and the reference to technological and financial assistance. The result of a last-minute amendment proposed by India, it enables developing countries to insist on the contingency of mitigation action on support, financial and technological, from developed countries.

A final point worth mentioning is that the Bali Action Plan eschews the usual Annex 1 and non-Annex 1 language – categories codified in the Convention - in favor of “developed” and “developing” countries. This opens possibility of the negotiations introducing some differentiation with respect to mitigation effort among developing countries, recognizing the reality that this category contains economically ascendant emerging economies, as well as far less developed nations.

In Bali the parties also agreed on the scope of the second article 9 review of the Protocol, which provides that the parties are required to periodically review the Protocol in light of the best available scientific information. To satisfy the terms of

²⁸¹ Bali Action Plan, FCCC/CP/2007/L.7/Rev.1, advance unedited version, http://unfccc.int/meetings/cop_13/items/4049.php.

²⁸² Bodansky, *supra* note 278.

the Protocol, a perfunctory first review took place at COP-12, and it was agreed that a more far-reaching effort would be carried out at in 2008. The review is contentious because industrialized countries, pointing to scientific findings on the future global mitigation effort, tend to argue that effectiveness demands that developing countries also shoulder some of the responsibility for reducing GHGs. The parties agreed that the second review would focus on issues such as the scope and effectiveness of the Kyoto protocol's flexibility mechanisms and progress by developed countries in meeting their commitments on finance and technology for developing countries.²⁸³ It was reiterated that the second review would not lead to new commitments for any Party.

In a long-awaited decision, the parties agreed on the governance structure of the Adaptation Fund, paving the way for this institution to become operational. As noted above, the issue dividing the developed and developed countries centered around who should manage and operate the Fund – the GEF, an institution dominated by donor countries, or another body, with greater decision-making powers for developing countries. In Nairobi developing countries had won agreement on the point that decision-making should be according to majority rule. In Bali, the parties agreed to establish the Adaptation Fund Board as the operating entity to “supervise and manage the Adaptation Fund, under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol”.²⁸⁴ Unlike the other climate change funds, therefore, the Adaptation Fund is not subject to the Council of the GEF, rather it is Adaptation Fund Board that will assume the function of drawing up operational guidelines policies and guidelines, as well as making decisions on projects and the allocation of funds. The decision provides that the Board will be composed of 16 members representing parties to the Protocol, with two representatives from each of the five UN regional groups, one from SIDS, one from the LDCs, two non-Annex I parties, and two Annex I parties. Decision-making is on the basis of consensus, failing which, by two-thirds majority. Since the developed countries have six representatives and developing countries ten, the latter have a majority.

The decision designated the GEF as the fund's secretariat, and the World Bank as its trustee, on an interim basis, with a review schedule to be held in three years. Overall, the decision means that developing countries have secured a key objective – control over the Fund – and at the same time benefiting from the experience and technical resources of the GEF as the secretariat implementing the Fund on a day-to-day basis. It remains to be seen whether the Board will be in a position to exercise real supervision and management, or whether the secretariat will exert effective control, and in this respect the interim nature of the arrangement almost certainly intended to have a moderating influence. Finally, although the available resources are a welcome increase over the trickle thus far made available for adaptation, they come nowhere near matching the need, so that allocation and priority setting are destined to be difficult and contentious.

²⁸³ Decision, Scope and content of the second review of the Kyoto Protocol pursuant to its Article 9, FCCC/KP/CMP/2007/L.8, advanced unedited version, http://unfccc.int/meetings/cop_13/items/4049.php.

²⁸⁴ Decision, Adaptation Fund, para. 4, FCCC/SBI/2007/L.30, advance unedited version, http://unfccc.int/meetings/cop_13/items/4049.php.

Despite the fact that deforestation in developing countries accounts for an estimated 20 per cent of global carbon dioxide emissions, projects designed to avoid deforestation – as opposed to reforestation – are not eligible for credits under the CDM.²⁸⁵ At Bali, progress was made in recognizing efforts aimed what has become known as reduced emissions from deforestation and degradation (REDD) in developing countries. Papua New Guinea, as the head of a coalition of 15 rainforest counties, placed the issue of crediting efforts to avoid deforestation on the agenda at COP-11 in Montreal. At COP-12, Brazil, which had thus far steadfastly resisted discussions of avoided deforestation, unveiled a competing proposal under which countries reducing their deforestation rates would be eligible for payments from an international fund established by donors, as opposed to emission credits under a market mechanism.

Moving in the direction of recognizing REDD efforts, the parties adopted a decision that, in carefully chosen language, encourages developing countries to explore a range of actions, including demonstration activities, to address deforestation and forest degradation.²⁸⁶ The decision also encourages work on methodological issues, such as the critical question of baselines against which reductions can be measured. In this respect, the decision states that countries may have recourse to the “indicative guidance” provided in an annex to the decision, as an aid in undertaking and evaluating demonstration activities. Not addressed in the decision is whether the incentives to reduce deforestation would flow from a market-based mechanism or donors. The issue of “[p]olicy approaches for and incentives” for REDD is singled out in the Bali Action Plan as one of the items for discussion by the Ad Hoc Working Group on Long-term Cooperative Action.

The issue of incentives for reducing deforestation is methodologically complex, because deforestation is the result of diverse social and economic factors. Extending credits for REDD would be a boon to countries that have so far been left out of the CDM market; however, the beneficiaries under the current CDM arrangements are way of a flood of cheap REDD credits. Nonetheless, the issue has gained momentum, with the World Bank announcing a \$300 million Forest Carbon Partnership Facility with the dual aim of building capacity to undertake projects and demonstrating the methodologies that could be scaled up for full-scale market.²⁸⁷

In the climate negotiations, when industrialized countries exert pressure on developing countries with respect to mitigation action, the latter push back with demands for access to clean technology and greater financial support. In the opening days of the Bali conference developing countries tried very hard to turn the attention to technology transfer and, what the argued, were the unfulfilled commitments made by industrialized countries.²⁸⁸ Their emphasis on technology transfer reflected a concern that the emphasis on new mitigation commitments, including for possibly

²⁸⁵ WORLD RESOURCES INSTITUTE, NAVIGATING THE NUMBERS 92 (2005).

²⁸⁶ Decision, Reducing emissions from deforestation in developing countries: approaches to stimulate action, FCCC/SBSTA/2007/L.23/Add.1/Rev.1, advance unedited version, http://unfccc.int/meetings/cop_13/items/4049.php.

²⁸⁷ *Forest Carbon Partnership Facility Takes Aim at Deforestation*, World Bank, December 11, 2007, <http://go.worldbank.org/1ELJCN2F60>.

²⁸⁸ COP-13 and COP/MOP-3 Highlights: Tuesday, December 4, 12 (345) EARTH NEGOTIATIONS BULLETIN (2007), <http://www.iisd.ca/download/pdf/enb12345e.pdf>.

for developing countries, should not come at the expense of agenda items reflecting their interests. In the end, the parties agreed on a decision requesting the Global Environment Facility (GEF) to establish a strategic program to scale up technology transfer.²⁸⁹ This request had its roots in a more ambitious proposal by the G77/China to establish a fund under the Convention dedicated to technology transfer.²⁹⁰ At the institutional level, the parties decided to re-constitute the Expert Group on Technology Transfer (EGTT) for a period of five years, with a number of tasks, including the development of a set of performance indicators, for use by the Subsidiary Body on Implementation to evaluate technology transfer activities.²⁹¹ Politically, an undoubted coup for the G77/China is the language of the Bali Action Plan, which very tightly links “mitigation action by developing countries” with technology and financing “in a measurable, reportable and verifiable manner”.²⁹² Opening the door to “mitigation actions” is significant, but the decision now spells out that one of conditions for progress – increased financial support and access to technology for developing countries.

In assessing the Bali conference, it is fair to ask whether negotiators succeeded in “defining success down”. With evidence and risk of climate change growing apace, it is sobering to realize compare the lack of ambition in the Bali road map with the conclusions of scientists and the instructive economic and technical assessments setting out how the problem can be tackled. A clear-eyed view of Bali would characterize it as “talks about talks” – and no negotiator worth his or her salt gives any more ground than necessary in the first round. Attempts by industrialized countries to defect from the more stringent targets-and-timetables approach of the Kyoto track to the Convention process could fatally undermine the willingness of developing countries define their mitigation actions. The negotiating process must thus balance commitments and actions under the Kyoto and Convention tracks. Given the variety of mitigation approaches likely to be considered, it will be important to convincingly demonstrate comparability of effort across different policy options.

International developments outside the Convention process

Climate change was one of the key topics addressed at Gleneagles G8 Summit, held under the presidency of the United Kingdom. In the summit communiqué countries agreed to launch a Dialogue on Climate Change, Clean Energy and Sustainable Development and asked the International Energy Agency (IEA) and World Bank, respectively, to develop alternative, clean energy scenarios

²⁸⁹ Decision, Development and transfer of technologies under the Subsidiary Body for Implementation, para. 3, FCCC/CP/2007/L.2, advance unedited version, http://unfccc.int/meetings/cop_13/items/4049.php.

²⁹⁰ *Summary of the Thirteenth Conference of the Parties to the UN Convention on Climate Change and Third Meeting of the Parties to the Kyoto Protocol, 3-15 December*, *supra* note 278, at 5.

²⁹¹ Development and transfer of technologies under the Subsidiary Body for Implementation, *supra* note 289. Decision, Development and transfer of technologies under the Subsidiary Body for Scientific and Technological Advice, FCCC/CP/2007/L.4, advance unedited version, http://unfccc.int/meetings/cop_13/items/4049.php.

²⁹² Bali Action Plan, *supra* note 281, at para. 1(b)(ii).

and a new framework for clean energy financing and investment.²⁹³ Forming part of the communiqué was short Plan of Action setting out specific actions taken and planned with respect to climate change. A number of Dialogue meetings were convened under the G8 plus 5 format,²⁹⁴ and the size and composition (outside the environment portfolio) having the potential to turn them into forums for meaningful discussion. Given the generally private nature of these discussions, not much is known of the conclusions reached, but from what has emerged, the G8 dialogue does not appear to have significantly contributed to progress in the international climate change negotiations. For their part, both the IEA and World Bank prepared a number of studies and reports pursuant to their Gleneagles mandates, with the Bank's work being especially useful in putting some hard numbers to the financing challenge for clean energy and adaptation to the adverse effects of climate change.²⁹⁵

Governments, non-governmental organizations (NGOs) and the business community have joined together in partnerships at local, national, regional and international levels. A few examples provide an indication of the scope and variety of partnerships and cooperative ventures that have arisen, some with international political and legal significance, others not. In January 2006 the U.S. and Australia – the two industrialized countries that had rejected the Kyoto Protocol and its approach of binding targets – launched the Asia-Pacific Partnership on Clean Development and Climate, dubbed APP.²⁹⁶ Other founding members – all Kyoto parties – are China, India, Japan, and the Republic of Korea, with Canada joining in 2007. The Partnership aims to accelerate the deployment of clean energy technologies through focused cooperation between member countries, working closely with industry. The APP established a policy and implantation committee to guide its work and oversee the activities of the eight public-private task forces addressing eight focal areas ranging from energy intensive sectors (aluminum) to renewable energy. In ambition and institutional structure the APP stands head and shoulders above other partnerships in the energy and climate field; continued engagement of key members and the commitment of financial resources are likely to determine whether it makes a real contribution with respect to clean technology, or as many skeptics suspected, merely served as a diversion by countries opposed to the Kyoto Protocol. Certainly, the deployment of clean energy technology has been insufficiently addressed under the current climate regime, and an initiative such as the APP – perhaps expanded to include membership from the EU and with closer links to the UNFCCC – could go some way towards remedying this deficiency.

²⁹³ The Gleneagles Communiqué,
http://www.fco.gov.uk/Files/kfile/PostG8_Gleneagles_CCChapeau.pdf.

²⁹⁴ The five are: Brazil, China, India, Mexico and South Africa.

²⁹⁵ See THE WORLD BANK, CLEAN ENERGY AND DEVELOPMENT: TOWARDS AN INVESTMENT FRAMEWORK, April 2006; CLEAN ENERGY AND DEVELOPMENT: A PROGRESS REPORT, (2006); and CLEAN ENERGY FOR DEVELOPMENT: THE WORLD BANK ACTION PLAN, (2007). Available at <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTENERGY/0,,menuPK:336812~pagePK:149018~piPK:149093~theSitePK:336806,00.html>.

²⁹⁶ See <http://www.asiapacificpartnership.org/>. For a perhaps the only legal analysis of the Asia-Pacific Partnership, see Christoph Holtwisch, *Asiatisch-pazifische Partnerschaft für umweltverträgliche Entwicklung und Klima – Blockade oder Antrieb für das internationale Klimaregime?*, unpublished Masters thesis, June 2007, copy on file with the author.

The Carbon Sequestration Leadership Forum (CLSF) is an example of a technology partnership with participation, including the U.S., Germany, Japan, China and India. The aim of the CLSF is to develop and make available cost-effective technologies for carbon dioxide capture and storage.²⁹⁷ Methane is powerful greenhouse gas emitted from landfills, mines and oil and gas installations. Bringing together twenty governments and well over one hundred corporations, the Methane to Markets Partnership is an international initiative aimed at advancing cost-effective, near-term methane recovery and use as a clean energy source.²⁹⁸ Other partnerships have been formed in specific industry sectors, for instance the cement industry, which is responsible for about 5 per cent of global carbon dioxide emissions from human activities. An example of practical cooperative action address emissions from this vital economic sector is the Cement Sustainability Initiative, formed by leading cement producers under the umbrella of the World Business Council on Sustainable Development (WBCSD).²⁹⁹

3.4 Conclusion and the road ahead

Drawing together the material covered in this chapter, this part briefly assesses climate change regime to date. Challenges for the way forward are also outlined. As outlined in this chapter, states have steadily (albeit slowly) built climate regime through successive Conferences of the Parties. Beginning with the historic Framework Convention, which established the goal of preventing dangerous interference with the climate system, states have established an impressive and intricate multilateral regime. While management and further development by Conferences of the Parties is now regarded as a feature of modern MEAs, the Convention and the Protocol have set a new mark for the development of rules by such treaty bodies. The multifaceted nature and technical complexity of many of the issues dealt with is quite staggering. At the same time, deep policy differences and weighty economic interests underlie many supposedly “technical” issues. This is true for instance of the somewhat arcane rules relating to emissions credits for land-use change and forestry. The political dimension stems from a number of sources. First, nominally the Convention and the Protocol are environmental treaties; in reality they have profound social and economic implications. The future division of the mitigation burden between industrialized and developing countries cuts to the core of disagreements on global development and fairness in the relations between states. This chapter has touched on how industrialized countries have attempted to extend binding commitments to developing countries, who in turn have invoked the principle of common but differentiated responsibilities, underlining the historical responsibility of developed countries. This aspect is explored in greater depth elsewhere in this thesis.³⁰⁰ Second, and more narrowly, the binding nature of Annex 1 parties’ targets under the Kyoto Protocol endows otherwise technical matters, for instance guidelines and standards for reporting and maintenance of emissions inventories, with greater significance. Failure to maintain adequate accounting

²⁹⁷ See <http://www.cslforum.org/about.htm>.

²⁹⁸ See <http://www.methanetomarkets.org/>.

²⁹⁹ See <http://www.wbcscement.org/>.

³⁰⁰ See chapter 4.

standards for GHG emissions and removals can lead to suspension of eligibility to use the emissions trading mechanisms.

The process of regular Conferences of the Parties, backed by preparatory work of the subsidiary bodies, has proved capable of sustaining and further developing the climate regime. In drafting the Convention, the parties went as far as they could at that time in addressing climate change; some, like the states of the European Union, would have preferred going further. (In fairness, it should be recalled that the IPCC's first assessment report, issued in 1990, concluded that the evidence as to whether warming was attributable to human or natural causes was evenly balanced.³⁰¹) The need to supplement the Convention with an instrument containing emission limitation and reduction targets was quickly recognized, leading to the launch of the negotiations for the Protocol.

The Convention and Protocol have established a number of important institutions and mechanisms. The Protocol's compliance system, while borrowing from experience of the Montreal Protocol, is in the view of many observers the most sophisticated mechanism of its kind in any MEA. The three flexibility mechanisms, particularly the CDM, exist at the intersection of public international law and domestic laws. The Protocol has established an international carbon market that will become fully operative in 2008, the first year of its commitment period. It has also helped to create a private sector constituency with a direct pecuniary interest in the continuation of emission controls (as opposed to the rather less direct interests of insurance companies or the professed "enlightened self-interest" of some oil companies).

An international body, the CDM Executive Board, guided in its work by the Conference of the Parties, regulates the activities of private sector entities involved with project activities in host countries. Host countries, in turn, set the criteria for approving projects and apply domestic laws as they would to any other investment activity. Putting this edifice in place has been the painstaking task of the parties in the years after the adoption of the Protocol in 1997 and the agreement on the Marrakesh Accords in 2001. The next few years were spent tying up remaining loose ends. The Protocol also became caught in a debilitating waiting game concerning its entry into force. Only with the 11th Conference of the Parties in Montreal in 2005 did negotiators turn to the next phase, that is, what would come after 2012 when the first Kyoto Commitment period expires.

It is perhaps not entirely unfair to say that the climate change regime has been a victim of its own success. After all, few other environmental regimes would be criticized for the level of productivity and range of issues considered under the Convention and Protocol. However, like a runner who thinks she has run a short distance race, only to be told to tackle a marathon, the process under Convention and Protocol recently suffered something of a loss of confidence. One reason was that "success" is increasingly defined within the parameter of climate negotiations themselves, so that it means incremental (and admittedly necessary) advances, but no "breakthrough" on the central issues dividing industrialized and developing countries. The result was that even insiders have expressed the view that fresh

³⁰¹ IPCC, SCIENTIFIC ASSESSMENT OF CLIMATE CHANGE – REPORT OF WORKING GROUP 1 (John Houghton et al, eds., 1990)

impetus from outside was needed.³⁰² The outcome of the Bali meeting has, however, succeeded in injecting renewed sense of purpose into the process.

As summarized in this chapter, and posited by scholars,³⁰³ regular and institutionalized procedures - such as those typified by Conferences of the Parties - contribute to a situation where states with diverse interests can nonetheless agree on, and steadily develop, institutions and rules to respond to a complex global problem. In short, the existence of a regular forum for discussion and generating agreement and coordination on core issues such monitoring and reporting of emissions has value, which is admitted by those who believe a decentralized approach is more practicable.³⁰⁴ Nevertheless, it possible that the facilitating embrace of the rules and institutions of the climate regime may have become a straitjacket, insulating the process from new ideas and permitting elaboration and refinement to substitute for action and innovation. These ideas will be further explored in the final chapter.

The climate regime as summarized in this chapter demonstrates a number of other disadvantages and weaknesses. First, the approach taken in the Protocol emphasized binding targets to be met over a relatively short time frame (2008-2012). Assuming full compliance by all countries, the cuts under the Protocol would have had a largely symbolic effect on global emissions and negligible impact on climate change; nonetheless, several countries are having difficulty meeting their individual targets. The combination of negligible environmental impact and the fact that many Annex 1 parties are not on track to meet their targets may appear to give credence to critics' arguments. This situation, coupled with uncertainties about compliance costs, naturally increased the incentive to exploit available loopholes. The overview of COP-6 (Part II) and COP-7 showed how the rules concerning the counting of sinks (forestry) were (re-)defined. This leads some scholars to conclude that agreements like the Kyoto Protocol are essentially unenforceable, because some parties will always find and exploit loopholes, and enforcement with real teeth is a non-starter in an international system based on voluntary agreement.³⁰⁵

Second, the sheer size of the annual COPs (drawing anywhere from 6,000-10,000 people) and the number of interests groups represented (environmental NGOs, business NGOs of various stripes) lends them an overwhelming quality. The sheer number of issues and their complexity elevated the transaction costs of effective participation in the negotiations. Only large and well-resourced delegations can participate meaningfully as national actors. Recent COPs seem to show that these mega-meetings do not lend themselves to creative solutions among the key players in developed and developing countries. Third, while groups have always been

³⁰² *UN official proposes global summit on climate change to plan next steps*, UN News Centre, 16 January 2007. The report states that: "The head of the United Nations Framework Convention on Climate Change (UNFCCC) today proposed the convening of a global summit backed by the UN to plan a future course of action for tackling the cross-cutting problem."

<http://www.un.org/apps/news/story.asp?NewsID=21244&Cr=climate&Cr1=change>

³⁰³ Stephen D. Krasner, *Structural causes and regime consequences: regimes as intervening variables* 36(2) INTERNATIONAL ORGANIZATION 185 (1982).

³⁰⁴ David Victor, *Fragmented carbon markets and reluctant nations: implications for the design of effective architectures*, in ARCHITECTURES FOR AGREEMENT: ADDRESSING GLOBAL CLIMATE ON THE POST-KYOTO WORLD 133 (Joseph E. Aldy & Robert N. Stavins, eds., 2007).

³⁰⁵ Scott Barrett, *A multitrack climate treaty system*, in ARCHITECTURES FOR AGREEMENT: ADDRESSING GLOBAL CLIMATE ON THE POST-KYOTO WORLD, *supra* note 304, at 237.

a feature of the climate negotiations, negotiations are frequently caught in stylized and predictable group politics and positions. At times, well-placed single-issue “blockers” can effectively make use of groups to advance their interests, which are often antithetical to those of other members of the group.³⁰⁶ In addition, negotiating time and resources are at times consumed by controversies, such as the Russian Proposal for voluntary commitments for developing countries.³⁰⁷

Fourth, while the multilateral process has almost universal participation,³⁰⁸ the reality is that a relatively small group of some 15 large emitters are responsible for over three-quarters of global emissions.³⁰⁹ By and large, they will also be responsible for much of the emissions growth in the coming decades. Theory suggests that a meaningful agreement among members of this group could have a major impact on global emissions. In practice, both initiatives that have tried something of this nature, the G8 plus 5 process and the US Administration’s Major Economies Meeting, do not appear to have gained much traction. (In fairness, at the time of writing in early 2008, it is too early to pass a conclusive judgment on then Major Economies Meeting initiative. All the same, the lesson seems to be that, for all its faults, the Convention process is imbued with a legitimacy not easily acquired by “start-ups”, especially where questions linger about the real motives.) Overall, if the Convention and Protocol multilateral negotiations do not deliver on the mandate agreed at Bali at the end of 2007, key parties may well consider that more is to be gained outside the existing process.

At the time of writing in early 2008, there is a sense that confidence has been restored in the multilateral climate negotiations. Effective disengagement of the US from discussions on a future climate regime has been replaced with a willingness to negotiate, albeit on narrowly circumscribed grounds. The Bali Action Plan makes it plain that developing countries regard mitigation actions on their part as contingent on access to technology and financial support from industrialized countries. Thus far the climate regime has, despite promises embedded in the text of the Convention, delivered little in the way of credible incentives for developing countries.

It is in the nature of negotiations for parties not to tip their hands and instead to wait for the “endgame”. Given the complicated nature of the climate change regime, and the widely diverging interests of parties, it may be optimistic to assume that one down-to-the-wire negotiation will resolve all the outstanding issues. Certainly, the widely appreciated need to begin implementing some adaptation and mitigation policies now, militates against a “Kyoto 2”, where years are spent fleshing out the rules, without initiating actual policy changes. There is increasing understanding that future commitments should establish a stable long-term framework, providing certainty for the carbon market and incentives for

³⁰⁶ For example the divergence in views on the urgency of mitigation measures between OPEC members and countries with membership in the Alliance of Small Island States (AOSIS).

³⁰⁷ See *supra* text accompanying notes 240 to 269.

³⁰⁸ As of the August 22, the Convention had 192 members. See List of Signatories & Ratification of the Convention, http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php. As of December 12, 2007, the Protocol had 177 parties, including one regional integration organization (the EEC). See Status of Ratification, http://unfccc.int/kyoto_protocol/background/status_of_ratification/items/2613.php.

³⁰⁹ WORLD RESOURCES INSTITUTE, *supra* note 285.

technological innovation. A graduated phasing in of policies would ensure that economic costs are minimized, thereby avoiding the premature retirement of expensive infrastructure. Targets would be tightened over time

Pressure is building in the US for domestic action on climate change. If regulation appears inevitable, some business interests will prefer federal policy to the uncertainty and higher transaction costs associated with a patchwork system of state regulation. Statements and actions in 2007 by US industry leaders indicate that they have concluded that domestic GHG regulation is inevitable. US domestic action is significant, because experience (e.g. ozone depleting substances under the Montreal Protocol) suggests that US international engagement/action is strongly correlated with commitment at the domestic level.

The conclusion has drawn out a number of challenges facing the next phase of the climate regime. At this point, the direction and shape of that next phase remain to be determined. A later chapter examines and evaluates a selection of proposals in this regard.

Chapter 4 - Theoretical aspects of equity and fairness

As you know, I oppose the Kyoto Protocol because it exempts 80 percent of the world, including major population centers such as China and India, from compliance, and would cause serious harm to the U.S. economy. The Senate's vote, 95-0, shows that there is a clear consensus that the Kyoto Protocol is an unfair and ineffective means of addressing global climate change concerns.¹

Those of us who live on small specks of land, ... in the Caribbean, have not agreed to be sacrificial lambs on the altar of success of industrial civilization.²

The economy is a wholly owned subsidiary of the environment, not the other way around.³

4.1 Introduction

Climate change is forcing difficult choices on decision-makers at national and international levels. In the face of competing demands and interests, countries are faced with committing significant resources in order to avoid consequences that, while beginning to be felt now, will only manifest themselves decades and in some case centuries from now. Decisions will need to be taken under conditions of considerable uncertainty as to the exact scope and timing of harm. Moreover, the adverse impacts of climate change will be unevenly distributed, with the countries least responsible for the historical build-up of greenhouse gases (GHGs) bearing the brunt. Under such conditions values and principles carry added weight in decision-making. Science provides information on the status of the climate system and projections of future changes. Economics attempts to present the costs and benefits of alternative courses of action. Yet observation of the global effort to combat climate change reveals that a key part of the discussion revolves around the contested concept of fairness. It is proposed that a juridical analysis of options to combat climate change can benefit from a critical engagement with the principle of fairness, as articulated in the discussions in the climate change regime.

Fairness and equity claims and discourse are a major part of the climate change regime. The Framework Convention, which is the multilateral basis for action to combat climate change, itself assigns a prominent place to equity. Equity and fairness are deep-rooted concepts in human relations, and it is not surprising to find them invoked in a setting where decisions with far-reaching social, economic and environmental consequences are made. Therefore it is desirable to improve our understanding of the dimensions and application of equity and fairness concepts in the climate negotiations. Understanding equity and fairness in climate change is all the more important as negotiators, policy-makers, and advocates turn to consider deepening and broadening the climate change regime after the end of the first

¹ President G.W. Bush, Text of letter to Senators Helms, Craig, Hagel, and Roberts, March 13, 2001, <http://www.whitehouse.gov/news/releases/2001/03/20010314.html>

² Statement by Ambassador Lionel Hurst of Antigua and Barbuda, at the International Red Cross Conference on Climate Change and Natural Disasters, The Hague, June 28, 2002, quoted in, BENITO MUELLER, OXFORD INSTITUTE OF ENERGY STUDIES, EQUITY IN CLIMATE CHANGE: THE GREAT DIVIDE 45 (2002).

³ GAYLORD NELSON, BEYOND EARTH DAY: FULFILLING THE PROMISE (2002).

commitment period of the Kyoto Protocol in 2012.⁴ As the science points out, the emission reductions that will result from the Protocol are a very modest first step in the face of the much more extensive (60-80 per cent) reductions that will be required in the coming decades. And equity and fairness will come to the fore even more, because the future stages of the international effort to combat climate change will see require some form of GHG controls for all countries, only the group of industrialized countries covered under the Kyoto Protocol.

4.2 Why fairness?

One straightforward reason for considering fairness and equity is that the language of the Framework Convention demands it. The Convention enjoins Parties "...to protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities."⁵ Another principle states that the special needs and circumstances of those countries particularly vulnerable to the adverse impacts of climate change should be given full consideration.⁶ It also states that in taking action in circumstances of scientific uncertainty, account should be taken of the need to ensure that measures and policies are cost-effective and achieve global benefits at the lowest possible cost.⁷ The guiding principles of the Convention refer explicitly to an equitable and fair approach to the protection of the climate system, with a circumscribed mention of cost-effectiveness and none relating to efficiency. A plain reading of the Convention's guiding principles, which are quite evenly balanced, points the reader in the direction of equity and fairness principles for burden-sharing. Taking the language of the Convention seriously gives meaning and purpose to an effort to explore and de-limit the meaning of equity and fairness in the climate change context. Since equity is not defined in the Convention it makes sense have recourse to background moral or ethical notions of fairness, as would the case in a domestic legal system when giving substance to concepts such as "equality" and "due process".⁸

A substantial body of scholarship and policy advocacy has developed that discusses equity and fairness in the climate change context.⁹ References to fairness

⁴ Joseph E. Aldy et al, *Addressing Costs: The Political Economy of Climate Change*, in BEYOND KYOTO: ADVANCING THE INTERNATIONAL EFFORT AGAINST CLIMATE CHANGE, PEW CENTER ON CLIMATE CHANGE (2003).

⁵ United Nations Framework Convention on Climate Change, *adopted on May 9, 1992*, art. 3(1), 1771 U.N.T.S 164 Article 3(1) [hereinafter UNFCCC].

⁶ UNFCCC, art. 3(2).

⁷ UNFCCC, art. 3(3).

⁸ Roger Shiner, *Law and Morality*, in A COMPANION TO PHILOSOPHY OF LAW AND LEGAL THEORY 436, 438 (Dennis Patterson, ed., 1996).

⁹ ANIL AGARWAL & SUNITA NARAIN, CENTRE FOR SCIENCE AND ENVIRONMENT, GLOBAL WARMING IN AN UNEQUAL WORLD: A CASE OF ENVIRONMENTAL COLONIALISM (1991); Henry Shue, *The Unavoidability of Justice*, in THE INTERNATIONAL POLITICS OF THE ENVIRONMENT: ACTORS, INTERESTS, AND INSTITUTIONS (Andrew Hurrell & Benedict Kingsbury, eds., 1992); Henry Shue, *Subsistence Emissions and Luxury Emissions*, 15 LAW & POLICY 40 (1993); Henry Shue, *After You: May Action by the Rich Be Contingent upon action by the Poor?* 1 INDIANA JOURNAL OF GLOBAL LEGAL STUDIES 343 (1994); Adam Rose, *Equity Considerations of Tradeable Carbon Emission Entitlements*, in COMBATING GLOBAL WARMING: STUDY ON A GLOBAL SYSTEM OF TRADEABLE CARBON EMISSION ENTITLEMENTS 55 (UNCTAD, U.N. Doc. UNCTAD/RDP/DFP/1, 1992); Michael Grubb, *Seeking*

and equity also abound in intergovernmental forums dealing with climate change. The two quotations above—taken from opposite sides of the climate change divide, one from the world’s largest emitter of GHGs, the other from a small island state with negligible emissions—illustrate how fairness is implicitly or explicitly invoked. From one perspective fairness requires that in addressing a problem all major contributors should play their part, regardless of their historical contribution to the problem. The other view sees a group of countries as the victims of another group of countries’ unwillingness to take responsibility for the consequence of their actions. The first statement raises the issue of costs (“would cause serious harm to the U.S. economy”), but it is evident that cost *per se* is not the crux of the objection – even if the named developing countries participated in the mitigation effort, the U.S. would still have to incur potentially substantial costs. Presumably, therefore, some arrangement that did not entirely “exempt” some countries would be perceived as fair. Burden-sharing is thus the issue. Opposite sides in the debate evidently believe that they derive advantage by articulating their position in terms of fairness. Unless one believes that statements such as those above mean nothing at all, it is worthwhile examining the language countries use and the context in which they do so.

Another strong reason for analyzing fairness is that parties are more likely to adhere to, and faithfully implement, an agreement that is considered fair and equitable. This is a straightforward notion, clearly applicable in the conduct between persons, and scholars have argued that it also applies to agreements between States.¹⁰

Global environmental problems bring to the fore the need to arrive at some degree of consensus about the meaning of fairness. A primary reason is that, unlike in other cases such as international trade, developed countries cannot rely on their unequal power and influence to essentially impose a solution, but rather require the voluntary cooperation of the poor countries. This opens the possibility for developed countries to deal on fair and equitable terms with developing countries, taking into account the imperative of poor countries to pursue economic and social development, while at the same time maintaining the stability of the climate system.¹¹

Fair Weather: Ethics and the International Debate on Climate Change 71 INTERNATIONAL AFFAIRS 463-96 (1995); Tariq Banuri et al, *Equity and Social Considerations*, in CLIMATE CHANGE 1995: ECONOMIC AND SOCIAL DIMENSIONS OF CLIMATE CHANGE, CONTRIBUTION OF WORKING GROUP III TO THE SECOND ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 83–124 (James P. Bruce et al eds., 1996); Mathew Paterson, *International Justice and Global Warming*, in THE ETHICAL DIMENSIONS OF GLOBAL CHANGE (Barry Holden, ed., 1996); Matthew Paterson, *Principles of Justice in the Context of Global Climate Change*, in INTERNATIONAL RELATIONS AND GLOBAL CLIMATE CHANGE 119 (Urs Luterbacher & Detlef F. Sprinz, eds., 2001); GLOBAL COMMONS INSTITUTE, CONTRACTION AND CONVERGENCE: A GLOBAL SOLUTION TO A GLOBAL PROBLEM (1997); Adam Rose et al, *International Equity and Differentiation in Global Warming Policy: An Application to Tradeable Emission Permits* 12(1) ENVIRONMENTAL AND RESOURCE ECONOMICS 25 (1998); FAIR WEATHER? EQUITY CONCERNS IN CLIMATE CHANGE 193 (Ferenc L. Tóth, ed., 1999), which contains contributions from the fields of economics, social science, and law; MARINA CAZORLA & MICHAEL TOMAN, INTERNATIONAL EQUITY AND CLIMATE CHANGE POLICY (Resources for the Future, Climate Issue Brief No. 27, December 2000).

¹⁰ THOMAS M. FRANCK, FAIRNESS IN INTERNATIONAL LAW AND INSTITUTIONS (1995).

¹¹ Henry Shue, *Global Environment and International Inequality* 75(3) INTERNATIONAL AFFAIRS 531 (1999).

4.3 International political context of fairness

This section examines how fairness is reflected in the political process of the climate change regime. Overall, it may be that in international environmental negotiations developing countries have more often cast their arguments in terms of justice and fairness.¹² There are several possible reasons for this. First, arguments framed in terms of fairness or justice appear more binding and forceful than those appealing to charity.¹³ Second, arguments appealing to moral and, if applicable legal, obligations have a universal character. A violation of a right to refrain from conduct that injures another, or responsibility to provide compensation for consequent damages, applies objectively to all who fall within the scope of the rule or principle. For example, while a policy arguments relating to economic efficiency in combating climate change may not have much to offer for a representative of Antigua and Barbuda, claiming the violation of a right by those responsible for GHG emissions has more traction.

Developing countries tend to view climate change in the context of their economic and social development.¹⁴ Imposing limits on their growth is regarded as unfair, given that they have not yet attained the level of development of industrialized countries. While not ruling out “cleaner” forms of development, they do not wish to bear any additional cost, particularly when the developed countries achieved their status with few if any environmental constraints.¹⁵ Developing countries do not want to be held responsible for remedying a problem not of their making. Accordingly, they emphasize industrialized countries’ dominant share of cumulative carbon dioxide emissions (76 per cent), and the fact their emissions account for less than half of current emissions.¹⁶ By some estimates the developing country carbon dioxide emissions will exceed those of industrialized countries by 2012.¹⁷ It also bears recalling, however, that some 140 countries, including small islands and least developed countries, are responsible for only 10 per cent of annual emissions.¹⁸ Developing countries also point out the difference in per capita emissions: some industrialized countries (Australia, Canada, United States) have per capita emissions more than six times those of China, and 13 times those of India.¹⁹

The argument from historical responsibility has obvious attractions in the international climate change discourse. At face value, basic notions of fairness seem

¹² Mark A. Drumbl, *Poverty, Wealth, and Obligation in International Law*, 76 TULANE LAW REVIEW 843, 898 (2002).

¹³ Drumbl, *supra* note 12, at 897 citing ANDREW DOBSON, JUSTICE AND THE ENVIRONMENT: CONCEPTIONS OF ENVIRONMENTAL SUSTAINABILITY AND THEORIES OF DISTRIBUTIVE JUSTICE 95 (1995).

¹⁴ MUELLER, *supra* note 2, at 45. The following draws on the points made by Mueller.

¹⁵ See Delhi Ministerial Declaration on Climate Change and Sustainable Development, decision 1/CP.8 U.N. Doc. FCCC/CP/2002/7/Add.1. (“Reaffirming that economic and social development and poverty eradication are the first and overriding priorities of developing country Parties”, preambular para. 3; Recognizing that climate change could endanger future well-being, ecosystems and economic progress in all regions, preambular para. 6.)

¹⁶ WORLD RESOURCES INSTITUTE, NAVIGATING THE NUMBERS 32 (2005).

¹⁷ INT. ENERGY AGENCY, WORLD ENERGY OUTLOOK 2006 81 (2006).

¹⁸ WORLD RESOURCES INSTITUTE, *supra* note 16, at 11.

¹⁹ WORLD RESOURCES INSTITUTE, *supra* note 16, at 21.

to suggest that the main contributors to a problem should be the ones carrying out abatement.²⁰ In this context, Brazil in 1997 put forward a proposal that would assign relative responsibilities to individual industrialized countries in accordance with their respective contributions to climate change, as measured by the induced change in temperature, based on historical emissions.²¹ According to recent research the average contributions to the global mean surface temperature increase in 2000 are around 40 per cent from OECD group of industrialized countries, 14 per cent from Eastern Europe and the former Soviet Union, 24 per cent from Asia, and 22 per cent from Africa and Latin America.²²

Arriving at accurate numbers for historical emissions is complicated by lack of available data, particularly for emissions from non-fuel sources, in particular land-use change and deforestation, as well non-CO₂ gases. The inclusion of emissions from deforestation can in some cases—notably Brazil and Indonesia—significantly increase countries' estimated historical share of cumulative emissions. The historical share of emissions is also sensitive to the selection of the time periods considered. Thus, analyzing the relative shares of industrialized and developing countries will yield markedly different results depending on whether the period of analysis ends, for instance, in 1990—at the beginning of rapid economic growth in major developing countries—or 2005. Based on the premise that each generation has an entitlement to an equal share of the atmosphere, it could be argued that some countries owe current and future generations in developing countries a “climate debt”. Attempts have been made to quantify this debt.²³

An important dimension of the fairness in the international political context relates to adaptation to the adverse impacts of climate change. Adaptation is increasingly being regarded as a twin priority with mitigation. Practically, this stems from the realization that the current concentration of GHGs already commits the planet to further warming, even if emissions were frozen at current levels.²⁴ (This is

²⁰ A country's historical emissions can be presented in at least three ways: on the basis of simple cumulative emissions, contribution to current concentrations of greenhouse gases, or the contribution to increase in global average temperature. See WORLD RESOURCES INSTITUTE, *supra* note 16, at 32 for a succinct explanation. The cumulative approach simply counts all emissions since a particular start date. In assessing a country's contributions to atmospheric concentrations, the second approach takes into account the decay of GHGs over time to give a country's share of emissions presently in the atmosphere.

²¹ U.N. Doc. FCCC /AGBM/1997/MISC.1/Add.3, 3. Although not adopted, the Brazilian remains on the agenda of the Conference of the Parties to the Convention whose Subsidiary Body for Technological and Scientific Advice (SBSTA) has sponsored continued research into contributions to climate change. See U.N. Doc. FCCC/SBSTA/2002/INF.14 for a summary of the research efforts carried out by various institutions, while up-to-date information is available at <http://www.match-info.net/>

²² Michel den Elzen et al, *Analysing countries' contributions to climate change: scientific and policy-related choices*, 8 (6) ENVIRONMENTAL SCIENCE & POLICY, 614 (2005).

²³ V. Bhaskar, *Distributive justice and the control of global warming*, in THE NORTH THE SOUTH AND THE ENVIRONMENT: ECOLOGICAL CONSTRAINTS AND THE GLOBAL ECONOMY 115-116 (V. Bhaskar & Andrew Glyn, eds., 1995); K. Smith, *Allocating responsibility for global warming: The natural debt index*, 20 AMBIO 95-96 (1991).

²⁴ IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 23 (Susan Solomon et al eds., 2007).

primarily due to the thermal inertia of the oceans, which have absorbed vast amounts of heat, which will be slowly released into the atmosphere.) Given their vulnerabilities – a combination of geographical location, reliance on sectors vulnerable to climate shocks (agriculture) and low level of technology and capital accumulation – developing countries are much less able to cope with the impacts of climate change and climate variability. A drought in the US may harm the prospects of farmers (many of whom will be cushioned by insurance) but loss of life is unlikely. For a country in a persistently drought-wracked region, such as Niger, where subsistence agriculture supports a large proportion of the population, the situation is quite different. A recent World Bank study concludes that progress in fighting poverty is under threat from increasingly severe weather events and climate variability.²⁵ The report goes on to note that 20 to 40 per cent of official development assistance (ODA) and public concessional finance (i.e. US\$20 – US\$40 billion per year) is subject to climate risk, and that very little ODA takes this risk into account.²⁶ There is a risk that climate change could impede the achievement of the United Nations Millennium Development Goals (MDGs), including those on poverty eradication, child mortality, combating HIV/AIDS, malaria and other diseases, and environmental sustainability.²⁷

Industrialized countries, particularly those of Europe, approach climate change from the perspective of correcting or managing an environmental imbalance. A change of lifestyle may be necessary, but by and large the adverse impacts of climate change will be less severe than in the sub-tropical countries, and the capacity to adapt is more developed than in poor countries.²⁸ It is suggested that framing the problem on these terms contributes to the climate regime's focus on mitigating GHG emissions, epitomized in the emission limitations and reductions required by the Kyoto Protocol. Adaptation to the adverse effects of climate change – sea-level rise, potentially greater frequency and intensity of extreme weather events, and the spread of insect-borne diseases – has only comparatively recently assumed importance.²⁹ Even so, funding for adaptation falls well short of what is needed, while progress on the issue in the climate talks was bogged down for a number of years.³⁰ From an environmental management perspective, informed by the scientific evidence of GHG and public concern, the primacy of mitigation on the agenda of the international climate change regime made sense. The Convention addresses issues of

²⁵ VICE PRESIDENCY FOR SUSTAINABLE DEVELOPMENT, THE WORLD BANK, AN INVESTMENT FRAMEWORK FOR CLEAN ENERGY AND DEVELOPMENT: A PROGRESS REPORT (2006).

²⁶ *Id.* at 38.

²⁷ THE WORLD BANK GROUP, MANAGING CLIMATE RISK: INTEGRATING ADAPTATION INTO WORLD BANK GROUP OPERATIONS 5 (2006). The Millennium Development Goals and related documents are available at <http://www.un.org/millenniumgoals/>.

²⁸ But cf. the 2004 heat wave in Europe which was responsible for some 30,000 deaths. Again, remedial measures, such as air conditioning and improved preparedness, can be taken relatively easily. Compare this with the impact of drought on countries in the Sahel or populations in low-lying areas such as Bangladesh or the Nile Delta.

²⁹ While the UNFCCC did deal with the question of funding for adaptation at the first Conference of the Parties in 1995 (decision 11/CP.1), it was only with the adoption of the Marrakesh Accords in 2001 that adaptation was addressed as a key area of action.

³⁰ See slow progress on articulating the Buenos Aires Programme of Action on Adaptation, adopted at 10th Conference of the Parties to the UNFCCC (COP-10) in 2004.

equity and solidarity, providing that vulnerable countries, particularly small island developing states and least developed countries (LDCs), should be assisted in adapting to the adverse effects of climate change.³¹ From the perspective of developing countries the promise of these provisions has not been fulfilled.³²

Some countries are more vulnerable and less able to take adaptive measures than others. The United Nations currently classifies fifty countries as least-developed countries (LDCs). These countries are generally those lowest on the development rung – one criteria is an annual per capita gross national income (GNI) of less than US\$750.³³ The individual and total GHG emissions of this group of countries are almost negligible. Due to their vulnerability to climate impacts, over the long term LDCs stand to gain from stringent emission limitations by major emitters. In the short- to medium term, however, they have less to gain from a climate change agenda dominated by mitigation concerns, including haggling among industrialized and emerging countries over the allocation of emission reductions. For small island states, the issue is even more pressing, and they have been the most vocal in calling for strict emission limitations. Their equity claims are directly founded on the existential threat posed by climate change.

4.3.1 The role of interests

An examination of the role fairness and equity must also acknowledge the role of interests in negotiations and formation of agreements. A discussion of equity and fairness needs to bear the importance of national interest in the positions taken by states in the climate arena. Even if cogent grounds of equity and fairness support a given outcome, few countries would accept it if it goes against the national interest, for instance by imposing economic costs on important domestic constituencies without tangible (political) benefits. In negotiations and the articulation of policy positions, the parties will naturally attempt to cast their position in the most favorable and persuasive light. Sometimes references to equity may therefore simply be disguised arguments concerning interests.

Realists focus on the primacy of interests in determining the conduct of states.³⁴ In analyzing a possible treaty outcome, a realist analysis might focus on the willingness to pay of the various actors, rather than conceptions of equity or fairness.³⁵ Realism developed as a reaction against Wilsonian liberal internationalism, and the “political realists” of the period after World War II articulated a theory of

³¹ See Convention, art. 4(8)-(9).

³² As further detailed in chapter 5, several funds have been established to address the adaptation and technology needs of developing countries. The Least Developed Country Fund and the Special Climate Change Fund, both of which are voluntary funds, have supported studies, capacity building and planning, but actual adaptation projects. The Adaptation Fund, which was finally operationalized in 2007, should have greater resources at its disposal.

³³ The other two criteria related to human resource weakness and economic vulnerability. See explanation on the website of the UN Representative for Least Developed Countries, Landlocked Countries and Small Island Developing States: <http://www.un.org/special-rep/ohrls/lcd/lcd%20criteria.htm>

³⁴ See, for the classic exposition, HANS J. MORGENTHAU, *POLITICS AMONG NATIONS: THE STRUGGLE FOR POWER AND PEACE* (4th ed. 1967).

³⁵ See David Victor, *The Regulation of Greenhouse Gases: Does Fairness Matter?*, in *FAIR WEATHER? EQUITY CONCERNS IN CLIMATE CHANGE*, 193 (Ferenc L. Tóth, ed., 1999).

relations between states based on their respective national interests.³⁶ Politics was struggle for power with no place for law as a constraining force.³⁷ Over time the political realism of the post-war period was redefined into what came to be known as neo-realism.³⁸ A full description of neo-realism is beyond the scope of this chapter. However, it holds as a key tenet that the basic “laws” of the international system flow from the relative distribution of capabilities (power) across the system.³⁹ Under neo-realism’s structural conception of international politics there is almost no role for international law. A basic assumption of realism is that states are rational actors, which, against the background of an anarchic international system, seek to further their interests with ultimately little regard for international law. Realists are skeptical of the idea that states can cooperate in international institutions to advance their common interests.

The second broad school of international relations is neo-liberal institutionalism or regime theory.⁴⁰ This school places less emphasis on power differentials between states, drawing attention instead to the role of international regimes and institutions in assisting states to realize their common interests. Neo-liberal institutionalism shares realism’s commitment to a theory of rational, self-interested actors, but it argues that regimes and institutions help states coordinate their behavior and achieve mutually beneficial outcomes.⁴¹ The standard definition of regimes is from Krasner: “Regimes are sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors’ expectations converge in a given area of international relations.”⁴² The neo-liberal institutionalist approach, in recognizing of the role that regimes and institutions can play in empowering states, rather than acting as constraints, is at least conceives a facilitative role for international law.⁴³

³⁶ See MORGENTHAU, *supra* note 34; GEORGE KENNAN, AMERICAN DIPLOMACY, 1900-1950 (1951)

³⁷ Anne-Marie Slaughter Burley, *International Law and International Relations Theory: A Dual Agenda*, 87 AM. J. INT’L L 205, 207-209 (1993).

³⁸ See Slaughter Burley, *supra* note 37, at 214-217. The architect of this development in international relations theory was Kenneth Waltz and the classic exposition of his “systemic” theory is KENNETH N. WALTZ, THEORY OF INTERNATIONAL POLITICS (1979). According to Waltz it is structural factors, particularly the relative distribution of power in the international system, that determine world politics. He differs from political realism in that power is regarded not as an end, but as a means to secure survival or security.

³⁹ KENNETH N. WALTZ, THEORY OF INTERNATIONAL POLITICS 66 (1979).

⁴⁰ A key text is ROBERT KEOHANE, AFTER HEGEMONY: COOPERATION AND DISCORD IN THE WORLD POLITICAL ECONOMY (1984).

⁴¹ ANDREAS HASENCLEVER ET AL THEORIES OF INTERNATIONAL REGIMES 23-24 (1997)

⁴² Stephen D. Krasner *Structural Causes and Regime Consequences: Regimes as Intervening Variables* 36(2) INTERNATIONAL ORGANIZATION 185 (1982). International institutions are regarded as having a potentially positive effect on compliance with the rules, because they expand or shrink the options available to rational state actors, which are constantly attempting to maximise their respective self-interest. It is important to note that in general neo-liberal institutionalism assumes, in common with realism, that states interests tend to be fairly stable over time and that interests shape interaction or cooperation and not vice versa. See also HASENCLEVER ET AL, *supra* note 41 at 23-24.

⁴³ Slaughter Burley, *supra* note 37, at 219-220. She concludes that institutionalism has led to a convergence between international relations and international law, with the former arriving at a new appreciation of the latter.

An analysis based on a hard-nosed calculation of interests may appear more rigorous and useful than engagement with the more amorphous concepts of equity and fairness. It is, however, worth considering realism in more detail. First, in complex climate negotiations actually determining *the* national interest on a particular issue is far less obvious than a casual consideration of realism suggests. Does the national interest lie in minimizing short-term costs, at the risk of a flawed outcome, leading to the probability of more severe climate impacts in the future? At a time when climate change is seen as potentially contributing to population migrations and conflicts over natural resources, there may be some degree of convergence with traditional national security interests. In sum, one can rightly question whether the national interest is readily definable and not highly dependent on context. Second, the interests of a state, and its willingness to pay for outcomes, are hardly monolithic – positions can and do change over time. If the interests of states are neither monolithic nor static, then how exactly do they change and why? It is suggested that there exists a dynamic interplay between interests and concepts such as fairness and equity. Confronted by the strongly held views of allies concerning the fairness and equity of a certain issue, a state may decide it is in its interests after all to concede the point (and bear the cost). While realist analysis appears to provide a sharp, rigorous counterpoint to the fuzzier normative analysis that is advocated here, realism generally takes interests (or willingness to pay) as given and cannot account adequately for their formation and change over time. In short, it is suggested that in understanding climate change policy realist interests-based approaches and normative investigations of equity and fairness both have a place.

4.4 Philosophical roots

This section briefly considers the main philosophical underpinning of equity and fairness. The intention is to provide a compact analysis shedding light on key aspects of these concepts.

According to Hart, fairness is primarily of relevance in two situations – in the distribution of a burden or benefit among a class of persons and where compensation or redress is claimed for an injury or wrong.⁴⁴ The idea of fairness is captured in the injunction to “treat like cases alike”. Equity is closely linked to fairness and is often used synonymously.⁴⁵ Thus it has been observed that in common usage equity means “the quality of being fair or impartial” or something that is fair and just”.⁴⁶ In a famous passage, Aristotle, who provided an early distinction between distributive and corrective justice, describes equity as mitigating the excesses implied by law’s absoluteness.⁴⁷ For him its essence is to be found in the adaptation of the law to the concrete case. In this view equity serves as a corrective to the harshness or injustice that may result from the inflexible application of a rule.

⁴⁴ HLA HART, *THE CONCEPT OF LAW* 154 (1961).

⁴⁵ Henry Shue, *Global Environment and International Inequality* 75(3) *INTERNATIONAL AFFAIRS* 531 (1999), (“What diplomats and lawyers call equity incorporates important aspects of what ordinary people everywhere call fairness.”).

⁴⁶ Banuri et al, *supra* note 9, at 85.

⁴⁷ ARISTOTLE, *NICOMACHEAN ETHICS* Book 5, Ch. 10 (W.D. Ross trans., Clarendon Press 1908, digital text, <http://www.ilt.columbia.edu/publications/artistotle.html>).

This sense is reflected in expressions such as “equitable principles”. Equity prevents or ameliorates injustice – it promotes fairness.

Issues of fairness generally relate to at least one of two dimensions: either fairness of general background conditions or fairness specific to the problem at hand.⁴⁸ The former leads to the question: Under what conditions are sufficient for the parties to be considered in a position to bargain for a “fair” outcome? If the parties in grossly unequal positions this undercuts the legitimacy of the process and the eventual outcome. For instance, it could be argued that relations between states are not structured in a neutral fashion, and there does exist a “global basic structure” of economic and political rules and relationships, which has distributional effects on states *inter se*, as well as on individuals within states.⁴⁹ Some would argue that this structure is revealed in the unequal relations between states, with key aspects of the international system “skewed” in favor of affluent and powerful states.⁵⁰ In general, the approach to fairness adopted here will focus on the narrower question of principles guiding allocation of responsibility for combating climate change, rather than analyzing the deeper inequalities of the international system. Nonetheless, in pursuing the former, it is necessary to bear in mind the implications of broader context in which parties make fairness claims.

The next section briefly examines two broad - and opposing - approaches to justice, which are relevant to understanding the character of fairness claims in the climate change context. Thereafter the analysis considers specific instances of fairness – procedural and distributive. It is determined that distributive fairness is applicable to the question of allocating responsibility for combating climate change and specific fairness and equity principles are analyzed in greater detail. The remainder of the section considers the intersection between economic analysis of climate change and fairness claims and presents selected examples of equity and fairness in international environmental law.

4.4.1 Utilitarianism

At its most basic utilitarianism holds that the morally right act or policy is the one that leads to the greatest happiness or utility for members of society.⁵¹ Thus the attraction of utilitarianism is that it evaluates the merits of an action not according to an abstract standard of right or wrong – religious text or other system of morals – but in terms of its consequences.⁵² It stands in contrast to moral theories based on rules or rights, which require the conformity with the relevant standards, without giving primacy to consequences.⁵³ Variants of utilitarianism are widespread, and utilitarian thinking is an aspect of everyday common sense reasoning.

⁴⁸ Henry Shue, *Environmental Change and Varieties of Justice*, in EARTHLY GOODS: ENVIRONMENTAL CHANGE AND SOCIAL JUSTICE 9, 13 (Fen Osler Hampson & Judith Reppy, eds., 1996).

⁴⁹ Allen Buchanan, *Rawls's Law of Peoples: Rules for a Vanished Westphalian World*, 110 (4) ETHICS 697 705-706 (2000); John Tasioulas, *International Law and the Limits of Fairness*, 13 EUR. J. INT. L. 993, 1009 (2003).

⁵⁰ Tasioulas, *supra* note 49, at 1006, quoting Thomas Pogge, *Priorities of Global Justice*, 32 METAPHILOSOPHY 9, 16-17 (2001).

⁵¹ WILL KYMLICKA, CONTEMPORARY POLITICAL PHILOSOPHY: AN INTRODUCTION 10 (2002).

⁵² *Id.* at 11.

⁵³ Moral theories based on rules are generally known as deontological theories.

Because of the way utilitarianism calculates overall utility – by adding individual preferences – it has been criticized for not accommodating the notion of just or fair shares.⁵⁴ For example, if in a community where all possess an equal (fair) share of land, the majority nonetheless prefer to use part of my land as a public park, that would be an acceptable outcome under utilitarianism, because it maximizes the utility of the community.⁵⁵ Policies based on utilitarianism are tend thus not to be sensitive to the distribution of burdens and benefits across individuals or countries.

With respect to the climate change, we see utilitarianism underpinning debates on the costs and benefits of various proposals to combat global warming. Utilitarian thinking is reflected in economic and policy analysis, an idea that is further explored below. Other aspects of the climate change issue, however, appeal not to utilitarianism but to its opposite, namely moral theories based on rules and rights. Thus inhabitants of small, low-lying island nations appeal for the equal consideration of their claim to continue their way of life; conservationists argue for the protection of species and eco-systems independent of their economic value; and right of future generations to enjoy the Earth in a comparable state as present generations.⁵⁶ Like the example above, such appeals generally fall on barren ground under utilitarian theories of justice.

4.4.2 Rule-based theories of justice

Although it may be easy to see the importance of fairness – whether at the level of inter-personal relationships or in the conduct of States – it is difficult to agree on a common, accepted understanding of what fairness means in practice. Society is simply too pluralistic for a settled consensus to exist with regards to fairness or similar contested concepts. Because of the difficulty in defining fairness from first principles, theories of fairness or justice have therefore shifted towards process-based models. Thus one enormously influential theory of justice has been that of John Rawls, who famously posited a “veil of ignorance”, so that people would not know what place they would occupy in society. Ignorant of their race, sex, class, health, economic status and so forth, what kind of framework would they choose for their society?⁵⁷ According to Rawls they would select two basic principles of justice. They are the following: 1. Every individual in a just society has an equal right to a fully adequate scheme of equal basic liberties consistent with a similar scheme for everyone. Social and economic inequalities must satisfy two conditions: first, such inequalities must be attached to offices and positions open to all under conditions of fair equality of opportunity; and second, they must be to the greatest benefit of the least advantaged members of society.⁵⁸

⁵⁴ KYMLICKA, *supra* note 51, at 41-45. For defenses of utilitarianism, see DAVID LYONS, *FORMS AND LIMITS OF UTILITARIANISM* (1965) and R.M. HARE *MORAL THINKING* (1981). For an attempt to apply utilitarianism to a range of global problems, including climate change, see PETER SINGER, *ONE WORLD: THE ETHICS OF GLOBALIZATION* (2002).

⁵⁵ KYMLICKA, *supra* note 51, at 41.

⁵⁶ EDITH BROWN WEISS, *IN FAIRNESS TO FUTURE GENERATIONS* (1989).

⁵⁷ JOHN RAWLS, *A THEORY OF JUSTICE* (1971).

⁵⁸ Maimon Schwarzschild, *Constitutional Law and Equality*, in *A COMPANION TO PHILOSOPHY OF LAW AND LEGAL THEORY* 156, 165 (1999, Dennis Patterson, ed.).

Rawls's theory has been adapted and applied at the international level by Thomas Franck in *Fairness in International Law and Institutions*.⁵⁹ Franck asserts that international law has entered a "post-ontological" age – it has entered an era in which it is no longer necessary to defend the status of international law as law, but where a vital task is to analyze its fairness.⁶⁰ According to Franck fairness consists of two elements: "right process" or procedural fairness, and substantive fairness, or the fairness of outcomes.⁶¹ We have an intuitive understanding for what constitutes right process, which is the rules of the game, as reflected in concepts familiar to lawyers, such as the principles of natural justice.⁶² Franck ties right process to legitimacy – decisions or allocations are legitimate where they are the outcome of a fair process.⁶³ When it is said that a rule or its application is legitimate, this implies that the rule was made or applied in accordance with right process, *and* that as a consequence it is deserving of voluntary compliance.⁶⁴ Franck goes on to state that "any analysis of fairness must include consideration of the consequential effects of a law: its distributive justice."⁶⁵ In theory and in practice it is the second aspect of fairness that proves particularly nettlesome, for how are we to settle on a common understanding of what is fair or just? Like the belief that a law is legitimate, the belief that it is distributively fair will promote voluntary compliance, "primarily because most people think it is *right* to act justly."⁶⁶

Franck regards the "growing awareness of irrefutable interdependence" and its effects as mounting evidence of the emergence of global community, or as we

⁵⁹ See Harold Koh, *Review Essay: Why Do Nations Obey International Law?* 106 YALE L.J. 2599 (1997) (reviewing: The New Sovereignty: Compliance with International Regulatory Agreements, Abram Chayes and Antonia Handler Chayes; Thomas M. Franck, *Fairness in International Law and Institutions* 1995); Phillip R. Trimble, *Globalization, International Institutions, and the Erosion of National Sovereignty and Democracy*, 95 MICH. L. REV. 1444 (1996-1997), (Review of Thomas M. Franck, *Fairness in International Law and Institutions* 1995); Gerry J. Simpson, *Is International Law Fair?* 17 MICH. J. INT. L. 615 (1996-1997) (review essay); *Symposium on Thomas M. Franck's Fairness in International Law and Institutions*, 13 (4) EUR. J. INT. L. 901-1030 (2002); Christopher Ward, Book Review, 48 INT. & COMP. L.Q. 237 (1999); Elisabeth Zoller, Book Review, 36 VA. J. INT. L. 1079 (1996).

⁶⁰ THOMAS M. FRANCK, *FAIRNESS IN INTERNATIONAL LAW AND INSTITUTIONS* (1995), 6 [hereinafter *Fairness*].

⁶¹ Fairness, *supra* note 60, at 7. The two elements of fairness are independent, in that a law viewed as substantively "unjust" can be applied in a procedurally fair manner – one need only think of ruling of the US Supreme Court on the "separate but equal" question in *Plessy v. Ferguson* 163 US 537 (1896). A well-known work taking the procedural element further to develop a procedural morality of law is LON L. FULLER, *THE MORALITY OF LAW* (1964). *Cf.* criticism by Hart and others that an unjust law could meet the requirements of Fuller's "inner morality". In the same way, a rule that is considered just could be adopted or applied in a manner that violates the tenets of right process. Tension may arise between the two aspects of fairness because the one – substantive justice – privileges change, while the other – right process – tends towards stability and order.

⁶² Two principal rules of natural justice are expressed in the following Latin phrases: *audi alteram partem* ("hear the other side") and *nemo iudex in sua causa* ("no person can judge a case in which he or she is a party").

⁶³ See THOMAS FRANCK, *THE POWER OF LEGITIMACY AMONG NATIONS* (1990).

⁶⁴ Fairness, *supra* note 60, at 26.

⁶⁵ *Id.* at 8.

⁶⁶ *Id.* (emphasis in original).

might term it the international community.⁶⁷ Having set the stage, Franck turns to the question of common values or conceptions of justice in the international community. While a range of allocation formulas can be applied, such as “to each according to capacity” or “to each according to just desserts”, arriving at a shared perception of fairness is much more difficult.⁶⁸ He concludes that there is no one conception of fairness, but rather that fairness “is a product of social context and history” that “captures in one word a *process of discourse, reasoning and negotiation*”.⁶⁹ He thus aligns himself with liberal thinking on justice, more particularly the very influential work of John Rawls.⁷⁰ In order for the fairness discourse, Franck postulates two minimum assumptions that serve as prerequisites for participation in the discourse.⁷¹

Since Franck has consciously adopted for an approach drawn from the liberal tradition, his conception of fairness attracts some familiar criticisms. Developed and developing countries disagree radically about the responsibility for climate change and the allocation of burdens to combat it. Against this backdrop, some have questioned whether Franck’s fairness discourse amounts to foisting one particular conception of fairness on the international community.⁷² Another criticism of Franck’s approach is that fairness is too narrow to serve as a standard for an ethical evaluation of international law.⁷³ Values other than legitimacy and distributive justice that play a role in the international system, such as peace, compassion (exemplified in humanitarian law) prosperity, and species survival risk being excluded.⁷⁴ The emphasis on distributive justice could result in the neglect of retributive and corrective justice, which are both strands firmly entwined in the discourse of justice

⁶⁷ However, he states that global community should not be seen as an alternative to the state, which remains the basis unit, and he does not advocate abandoning the concept of state sovereignty. *Id.* at 12-13.

⁶⁸ *Id.* at 13.

⁶⁹ *Id.* at 14 (emphasis in original).

⁷⁰ See RAWLS, *supra* note 57 and POLITICAL LIBERALISM (1993).

⁷¹ Fairness, *supra* note 60, at 18. Franck puts forward two such “gatekeepers”: the first is the “no trumping rule” and the second is the “maximin principle”. The former holds that no participant may raise a principle - whether religious, philosophical or ideological - that is non-negotiable. Instead, everything must be subject to discussion. The maximin principle holds that “unequal distribution is justifiable only if it narrows, or does not widen, the existing inequality of persons’ and/or states’ entitlements”. Franck provides the following example: A scheme that allocates \$100 to every person who already has \$100 but only \$50 to persons with \$10 proportionately narrows the gap between them and is therefore not axiomatically excluded from fairness discourse.

⁷² This could be termed the “ethnocentric” critique. See Tasioulas, *supra* note 49, at 994 (2003); Trimble, *supra* note 59, at 1952-1954. Because Franck relies on a process-based approach, buttressed by his two gatekeeper principles, this in theory should allay some of the fears regarding ethnocentrism. However, on closer examination his no trumping principle would effectively exclude parties holding strong core beliefs. These points parallel those who criticize liberal approaches to diversity and multi-culturalism for misunderstanding the nature of a deeply held worldviews or religious faith.

⁷³ Tasioulas, *supra* note 49, at 1000. He provides a more closely argued criticism of the primacy Franck assigns to the maximin principle, pointing out that in Rawls’ account it is subordinate to a first principle of the equal right to liberty.

⁷⁴ *Id.* at 1001.

in the international community.⁷⁵ Lastly, Franck's adoption of distributive justice as the primary value against which to evaluate environmental law supposedly "implicates him in an anthropocentric perspective that regards the natural world as simply made up of so many 'resources' that are to be apportioned among humans in order to realize their interests."⁷⁶

Franck adopts and adapts concepts from legal theory and political philosophy and applies them to the international community. It is an open question whether these theories can validly be applied at the inter-state level.⁷⁷ Franck's conception of fairness draws heavily on the work of John Rawls, who himself saw his original work as applying only within a liberal democratic society, not between States.⁷⁸

The next section turns briefly to procedural justice before presenting a detailed analysis of distributive fairness in the context of climate change.

4.5 Procedural fairness

As noted earlier, fairness considerations can be applied to the general background conditions, that is the conditions under which distributions are made, as well as the fairness of the allocation itself. The former aspect concerns "procedural" fairness, and encompasses rules on participation, the exclusion of coercive tactics, and the general ability of parties to bargain on roughly equal terms. Basic and formal elements of procedural fairness flow from the sovereign equality of states, so that countries are entitled to participate equally in the intergovernmental negotiations. As

⁷⁵ The former is reflected in the tribunals established for Rwanda and the former Yugoslavia and the International Criminal Court, while the latter finds expression in the calls for assistance in adapting to the effects of climate change.

⁷⁶ Tasioulas, *supra* note 49, at 1002.

⁷⁷ The existence of a real and meaningful "global community" is open to question, or at the very least it is a nascent and fragile community. For an analysis of the notion of community in Franck's FAIRNESS see, Dino Kritsiotis, *Imagining The International Community*, 13 EUR. J. INT. L. 961 (2002). Technological advances and greater interdependence may not necessarily lead to a convergence in values, but may in fact prove compatible with fragmentation and the spread of extremist ideologies of all stripes. For example, seen from the early 21st century, the vision triumph of liberal values articulated by Francis Fukuyama in *THE END OF HISTORY* (1992) appears somewhat premature. It can also be questioned whether principles, or process-oriented explanations developed against the backdrop of a (liberal) state can be employed in the realm of relations between states, which lacks the constitutional structure and order of domestic systems and is characterized to a greater extent by the exercise of power. The extreme view is that interests determine states' behavior; reference to principles is a distraction. The competing approaches to international law, including the realist conception, are considered elsewhere and cannot be treated in greater detail here.

⁷⁸ See JOHN RAWLS, *THE LAW OF PEOPLES* (1999). In this later work he addresses the question of justice at the international level. Rawls dispenses with a distributive principle, substituting for it a much weaker principle to "assist other peoples living under unfavourable conditions that prevent their having a just or decent political and social regime." *Id.* at 37. This principle of assistance is founded not on principles of distributive justice, but on humanitarian grounds, with the aim of helping societies that are not liberal or decent achieve this status. The reason Rawls opts not to extend the difference principle to the global level is revealed in the following passage: "I would conjecture that there is no society in anywhere in the world – except marginal cases – with resources so scarce that it could not, were it reasonably and rationally organized and governed, become well-ordered." *Id.* at 108. Franck faults two elements that he identifies in this argument – that underdevelopment or being burdened is largely the result of societies' value choices and that no distributive obligations exist in the absence of a meaningful global community. Fairness, 18-19

in other contexts, such formal equality is substantially reduced by the inequalities among states, reflected in developed countries' generally superior ability to design and analyze policy proposals, availability of technical expertise, and negotiating experience. The negotiating structure and bargaining process can be structured to incorporate aspects of procedural justice, for instance by formulating a broad and inclusive agenda, clear and transparent rules, and giving all parties a say in selecting procedures.⁷⁹

Concerns exist that developed countries may compel developing countries to accept an unfavorable agreement.⁸⁰ Fairness in the negotiating process will become more salient as developing countries prepare to take on commitments, and in the process will be required to propose and analyze various proposals.⁸¹ Up to now, strength in numbers has permitted developing countries to achieve common aims – leadership on mitigation by industrialized countries, while blocking emission limitation commitments for developing countries – but the next phase of the negotiations will demand a more proactive stance, with the risks that it entails. Undoubtedly industrialized countries possess advantages in terms of resources – size of delegations, experts, and ability to design and evaluate technical proposals – which developing countries generally cannot match. In general developing country delegations are small, which makes it difficult to participate meaningfully in the negotiations, which quite often take place simultaneously in small groups. Maintaining continuity is also a challenge – the loss of institutional memory and familiarity with the issues is particularly acute for small delegations. However, the same is not necessarily true of larger, rapidly industrializing developing countries, such as India and China. To level the playing field, some observers have suggested increased capacity-building for developing country negotiators and technical experts.⁸² To some extent acceptance of negotiating process and outcomes will be affected by participants' sense of "ownership" and mutual adherence to procedures. Violations of fairness in the process can also be expected to influence the stability of the agreement (compliance).

4.6 Distributive justice – fairness of allocation

Equity and fairness in climate change has been of prominent concern in the context of how to allocate the costs of mitigation among countries. Other important aspects of fairness international equity are procedural fairness and fairness in the context of adaptation to the adverse effects of climate change. Procedural justice within the climate negotiations has been briefly touched on above. Some of the ethical questions relating to adaptation are common the analysis pursued in this thesis, although mitigation, more than adaptation, is the focus of this enquiry.⁸³

⁷⁹ Cecilia Albin, *Getting to Fairness: Negotiations over Global Public Goods*, in PROVIDING GLOBAL PUBLIC GOODS: MANAGING GLOBALIZATION 263, 270-272 (Inge Kaul et al, eds., 2003)

⁸⁰ Rose, *supra* note 9, at 58.

⁸¹ Pamela Chasek & Lavanya Rajamani, *Steps toward Enhanced Parity: Negotiating Capacity and Strategies of Developing Countries*, in PROVIDING GLOBAL PUBLIC GOODS: MANAGING GLOBALIZATION 245 (Inge Kaul et al, eds., 2003); DEUTSCHE GESELLSCHAFT FÜR TECHNISCHE ZUSAMMENARBEIT, SOUTH-NORTH DIALOGUE ON EQUITY IN THE GREENHOUSE: A PROPOSAL FOR AN ADEQUATE AND EQUITABLE CLIMATE CHANGE AGREEMENT 2 (2004), <http://www.wupperinst.org/en/home/>.

⁸² Chasek & Rajamani, *supra* note 81.

⁸³ See FAIRNESS IN ADAPTATION TO CLIMATE CHANGE (W. Neil Adger et al, eds., 2006).

Climate change also has important implications for the sharing of burdens and benefits within countries, but a consideration of the intra-national equity issues of falls outside the scope of this thesis.

The philosopher Henry Shue has suggested that the questions relating to distributive justice in the case of climate change are at least the following:⁸⁴

1. What is a fair allocation of the costs of preventing the global warming that is still avoidable?
2. What is a fair allocation of the costs of coping with the social consequences of the global warming that will in fact not be avoided?
3. What background allocation of wealth would allow international bargaining – about issues like (1) and (2) – to be a fair process?
4. What is a fair allocation of emissions of greenhouse gases (a) over the long term and (b) during the transition to the long-term allocation?

These questions usefully frame the discussion of distributive fairness in the context of climate change. The focus of what follows relates to point four above. A satisfactory definition of equity and fairness is destined to remain elusive. Therefore the chosen approach is to identify and briefly discuss a number, by no means all, equity principles. In particular, the objective of this section is to articulate a number of equity and fairness principles that could potentially constitute the basis for a rough, working ethical consensus in the climate change regime. The following representative fairness and equity principles have been selected and are analyzed in turn: egalitarian; responsibility or contribution; need; and capability based. Naturally, these various principles interact and overlap in the climate change discourse.

Egalitarian principles recognize the equal entitlement of persons to some good, condition (happiness), opportunity and so forth. In the context of climate change, egalitarian principles would hold that all humans have an equal right in the protective qualities of the atmosphere. More specifically, this translates to an equal allocation, between generations, of the total atmospheric capacity to safely absorb GHG emissions. Equality exerts a powerful pull in ethical as well as legal arguments, and it is often presumed to be the default standard for allocation, so that the burden of proof falls on those advocating differential treatment.⁸⁵ The appeal of equality - with its strict application of simple standard - risks engendering injustice by not accounting for individual circumstance. For example, in order to be habitable, some regions of the world require space heating in winter, resulting in higher GHG emissions per capita than temperate regions.⁸⁶ Is an equal allocation fair in these circumstances? Variants of equality that hold that differences are intrinsically wrong – that is, regardless of how they came about – can result in unacceptable outcomes when pushed to the limit. For example, strict adherence to intrinsic equality would hold in a situation where one group lives just above subsistence levels, and another at subsistence levels, the just outcome would be for both groups to be “equal” and live at the subsistence level. Thus adherence to equality as an overriding standard may

⁸⁴ Shue, *Subsistence Emissions*, *supra* note 9, at 40.

⁸⁵ DONALD BROWN ET AL, WHITE PAPER ON THE ETHICAL DIMENSIONS OF CLIMATE CHANGE 21 (undated), <http://rockethics.psu.edu/climate/index.htm>.

⁸⁶ Allowing trading between temperate and colder regions would result in an efficient allocation of emission entitlements (the Coase Theorem) but it this says nothing about the fairness or equity of the final distribution.

lead to what is termed the “leveling down” effect.⁸⁷ Overall, egalitarian approaches would support stronger mitigation action in the present, so as to secure the interest of future generations, and at the same time a redistribution to equalize the position of states. Equality principles would favor both preventative and compensatory transfers, particularly as climate change is likely to exacerbate the inequality of developing countries.

Another line of equity and fairness thinking emphasizes that a distribution of benefits and burdens should accord priority to the poorest or most at risk. If climate change were to impose very adverse impacts on future generations, this would justify expensive mitigation, at the expense of present generations. In contemporary terms, an approach would prioritize the achievement of the Millennium Development Goals, which cover basic global development objectives such as the eradication of extreme poverty and hunger.⁸⁸ Proceeding on the basis that adaptation to climate change is a viable response, it has been argued that priority should be given to the poorest populations now, rather than devoting the bulk of scarce resources to expensive mitigation efforts.⁸⁹

Responsibility as an ethical principle has an intuitive appeal. In fact industrialized countries’ responsibility for the accumulated stock of GHGs is frequently cited in the climate negotiations. The ethical concept is also reflected in the principle of common but differentiated responsibilities. However, despite its appeal, the contribution or responsibility principle is not as cogent as it appears on first consideration. A first problem relates to the notion of responsibility across generations. Among philosophers fairness with respect to future generations encounters several theoretical hurdles, among them the non-identity problem, which holds that policies or actions that are likely to diminish welfare in the future will harm few members of future generations because those very same policies are the necessary conditions for those people to come into existence.⁹⁰ In the context of climate change, the statement of the problem holds that “[t]he emissions that contributed to the emergence of climate change as a global problem originated in acts and policies that have affected the size and composition of subsequent generations, such that very few members of the present generation can plausibly argue that they have been harmed, or made worse off, by the historical greenhouse gas emissions associated with industrialization.”⁹¹ Although the non-identity problem may seem fit to remain confined to the philosophy seminar room, the underpinning reasoning is in fact found in the discourse about responsibility for climate change. For instance, while it is admitted that current and future generations will be exposed to the impacts of climate change that was not of their making, it is argued that those generations also benefit from the technological advances and conveniences of modern society associated with those emissions. The effect of this line of argument

⁸⁷ EDWARD A. PAGE, CLIMATE CHANGE, JUSTICE AND FUTURE GENERATIONS 80-81 (2006).

⁸⁸ For the eight Goals and related information, see <http://www.un.org/millenniumgoals/>.

⁸⁹ See Alan Manne & Robert Mendelsohn, *Climate Change Alternative Approaches*, in GLOBAL CRISES, GLOBAL SOLUTIONS 44, 49 (Bjørn Lomborg, ed., 2004).

⁹⁰ PAGE, *supra* note 87, at 132. On the problem in a context of ethics and philosophy, see DEREK PARFITT, REASONS AND PERSONS 351-359 (1984).

⁹¹ PAGE, *supra* note 87, at 170.

is to weaken intergenerational equity, particularly where it is founded on responsibility.

The responsibility principle has a second weakness - arguments from responsibility are undermined if the conduct that caused the harm was not recognized as wrongful at the time that it occurred.⁹² It is questionable whether the bulk of past emissions can be considered unlawful under existing international law.⁹³ Under the prevailing view in international law an action must have been wrongful or unlawful in that it violated a duty of care or breached a rule of international law in order to establish responsibility.⁹⁴ In law foreseeability is usually considered as a prerequisite for liability. Ignorance of the reality and consequences of climate change – at which point this ceased to be the case is open to debate – could mitigate wrongfulness of industrialized countries' past emissions. And what of oil-producing countries, many of which have achieved a degree of welfare for their populations, but at the cost of higher than average emissions? Finally, it is argued that those responsible for much of the accumulated stock of GHGs are now dead, and that it would be unfair to shoulder the present generation with the burden of responsibility. Nonetheless, responsibility retains a strong appeal, reflected for instance in the "polluter pays" principle.

Another strand of equity and fairness focuses on ability to pay or the capability of industrialized countries to take the lead in mitigation activities. A combination of need and capability provide the ethically relevant grounds on which to justify differential treatment.⁹⁵ The need for leadership by developed countries is explicitly recognized in the Convention. At first glance, a capability approach seems to avoid some of the problems of the responsibility approach. However, ability alone seems an inadequate grounding for an affirmative duty, so that any action would resemble charity or altruism. Page asks us to consider a situation where climate change was an entirely natural phenomenon, but the distribution of impacts remained the same as under the current scenario.⁹⁶ Would we feel that the duty to

⁹² Page explains that arguments from responsibility depend on what he terms "historical principles" which evaluate the distribution of benefits and burdens in terms of how they came about; if their origins involved no wrong-doing they are just, but if wrong-doing occurred then a redistribution is allowed to re-establish justice. *Id.* 169. This means answering the question whether the actions that led to the GHG emissions were wrongful. One of the most well known exponents of an approach tracing justice based on initial distributions is ROBERT NOZICK, *ANARCHY, STATE, AND UTOPIA* (1974).

⁹³ But *cf.* for a detailed attempt to construct a basis for liability, see RODA VERHEYEN, *CLIMATE CHANGE AND INTERNATIONAL LAW: PREVENTION DUTIES AND STATE RESPONSIBILITY* (2005). See also Richard S. J. Tol & Roda Verheyen, *State responsibility and compensation for climate change damages – a legal and economic analysis* 32 *ENERGY POLICY* 1109 (2004).

⁹⁴ See the *Draft Articles on State Responsibility* prepared by the International Law Commission. Art. 1 states, "Every internationally wrongful act of a State entails the international responsibility of that State." Art. 2 provides that "There is an internationally wrongful act of a State when conduct consisting of an action or omission: (a) Is attributable to the State under international law; and (b) Constitutes a breach of an international obligation of the State" (own italics). *Report of the of the International Law Commission on its 53rd session*, U.N. GAOR, 56th Sess., Suppl. No. 10, UN Doc. A/56/10. The Draft Articles are available at: <http://www.un.org/law/ilc/>. The approach taken in the Draft Articles does not encompass strict or direct liability. For an overview of the Draft Articles, see VERHEYEN, *CLIMATE CHANGE AND INTERNATIONAL LAW*, *supra* note 93, at 229-248.

⁹⁵ BROWN ET AL, *supra* note 85 at 21.

⁹⁶ PAGE, *supra* note 87, at 172-173.

assist was as compelling under such circumstances? This suggests that even within an “ability to pay” framework there is a residual linkage with responsibility arguments. One reason may be that there is an implicit assumption that those who have the capability to address global environmental problems are also the ones that caused them. Importantly, capability is dynamic, so that ethical responsibilities are seen to change over time.

Equity principle	Content	Implied burden-sharing
Egalitarian	Every individual has an equal right to pollute or to be protected from pollution	Limit emissions in proportion to population - equal per capita emissions
Sovereignty	Every country has an equal right pollute or be protected from pollution; current level of emissions constitutes a status quo right	Limit emissions proportionally across all countries; effect is to maintain relative emissions between them - acquired rights / “grandfathering” - grandfathering
Horizontal	Countries with similar economic circumstances have similar emission rights and burden-sharing responsibilities	Equalize net welfare change across countries (net cost of abatement as a proportion of GDP equal for all countries)
Vertical	The greater the ability to pay the greater the economic burden	Net cost of abatement is inversely correlated with per capita GDP - progressive sharing of cost burden - corresponds to capability
Priority	Prioritize and maximize benefits for the poorest nations	Least limitations on poorest countries; large proportion of entitlements for poorest countries - variety of vertical equity or priority - emphasis on needs
Compensation	Indemnify countries for undue costs and damages	Transfers or allocations to ensure no country suffers a net loss of welfare
Responsibility	Economic burden is proportional emissions, thus polluter pays (can be extended to include historical emissions)	Abatement costs shared across countries in proportion to emission levels - one measure is CO ₂ per capita

Adapted from Ringius (1999) and Rose (1992)

The discussion above analyzed selected equity and fairness principles at a very abstract level. In order to explore the practical implications for climate policy, it is necessary to go one step further and identify particular burden-sharing rules implied by a given set of equity and fairness principles. The table above does this by drawing on equity principles that are fairly commonly noted in the literature.⁹⁷ There are of course other equity and fairness principles, as well as different formulations. As noted before, the purpose is not to select a “winner”, but instead map out various principles that might contribute to a working consensus.

The next section analyzes the intersection between the economics of climate change and equity and fairness.

4.7 Economics

Economic analysis plays an important role in the debate on climate change, and this section will briefly examine conflicts arising at the intersection of economics and principles of equity and fairness. The objective of welfare economics, which is fundamental to much analysis of public policy, is to work out policies that maximize overall social welfare, where welfare is understood as the consumption of goods and services by individuals.⁹⁸ The ethical framework animating welfare economics is then consequentialism – what matters are the effects of an action, in this case welfare maximization.⁹⁹ This standard approach does not incorporate ethical concerns related to procedures for decision-making nor a commitment to rights, fairness or freedom.¹⁰⁰

As noted earlier, developing countries, which have a lower economic and social resource base than industrialized countries, will be hardest hit by climate change. One effect of climate change will thus be to reinforce existing global inequalities in welfare. Recently there has been an acknowledgement that climate change poses difficult questions for standard economic approaches to policy analysis, and that there is consequently a need to refer to a broader range of ethical perspectives and frameworks than those underpinning the orthodox approach.¹⁰¹

Putting a cost on the likely impacts of climate change has a number of potential ethical pitfalls, which may not be immediately apparent from the rational presentation of economic studies.¹⁰² First, it is not clear how one should aggregate and compare impacts on different countries to arrive at a measure of global welfare. In practice, economists express the aggregate measure of wellbeing in terms of real

⁹⁷ See e.g. Rose, *supra* note 9; Lasse Ringius et al, *Burden Sharing and Fairness Principles in International Climate Policy*, 2(1) INTERNATIONAL ENVIRONMENTAL AGREEMENTS: POLITICS, LAW AND ECONOMICS 1 (2002).

⁹⁸ NICHOLAS STERN, CABINET OFFICE, HM TREASURY, *THE ECONOMICS OF CLIMATE CHANGE*, THE STERN REVIEW 28 (2006).

⁹⁹ STEVEN C. HACKETT, *ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS: THEORY, POLICY AND THE SUSTAINABLE SOCIETY* 24 (2001).

¹⁰⁰ STERN, *supra* note 98, at 29; Seth Baum, *Beyond the Ramsey Model for climate change assessments*, ETHICS IN SCIENCE & ENVIRONMENTAL POLITICS 15, 16 (2007).

¹⁰¹ STERN, *supra* note 98, at 28.

¹⁰² Michael Grubb, *Seeking Fair Weather: Ethics and the International Debate on Climate Change* 71 INTERNATIONAL AFFAIRS 463, 470 (1995). The text accompanying notes 102 to 109 draws on the arguments articulated by Grubb.

income.¹⁰³ This process of arriving at an overall welfare function by (notionally) summing the wellbeing of different people involves value judgments about how effect (utility) of consumption for these individuals. Thus these models have to account for the fact that the same increase in consumption means more to a poor person than it does to a rich one. There are doubts whether the models meaningfully capture the utility of consumption.¹⁰⁴ Second, expressing wellbeing in terms of income raises the question of how to value impacts on the environment and health, especially human life.¹⁰⁵ The problem arises because in order to make cost-benefit comparisons, a monetary value must be assigned to human life, which is usually arrived at in relation to per capita GDP, yielding the result that the life of a person in a developed country is usually “worth” more than that of a person living in a developing country. In itself it may not be objectionable to value life differently in different places – a poor country simply cannot afford to spend the same amount on medical care as a richer one and must take this fact into account when making policy. Ethical questions arise, however, because climate change involves the actions of some countries impacting on others. It seems unfair that developed countries, on aggregate responsible for the climate impacts on poor countries, should be able to dilute their responsibility on the basis of the assignment of a low “value of life” measure in poor countries.

This points raises the more general problem concerning the valuation of non-market goods – how would one value the loss of coral reefs, cultural practices associated with a way of life on small islands.¹⁰⁶ The available economic tools and methodologies give widely divergent answers and do not appear to be adequate to the challenge.¹⁰⁷ At some level attempts to bring large-scale global non-market goods into the ambit of economic analysis may not be possible in any coherent way. This touches on the deeper question of how, if at all, the economic system can be ever be integrated with the natural system.¹⁰⁸ Fairness, equity and other moral values are critical in adequately assessing of the impacts of climate change on non-market goods.

A third important issue in relation economics and climate change concerns intergenerational equity. How much the current generations pay to save future generations from the impacts of climate change? Climate change will result in damages occurring in the future, but mitigation costs will be incurred from now into the future. It is therefore useful to have some method of comparing these near-term costs with the more distant benefits. In tackling this question, economics applies a

¹⁰³ STERN, *supra* note 98, at 30.

¹⁰⁴ Baum, *supra* note 100, at 16-17.

¹⁰⁵ Grubb, *supra* note 102, at 470.

¹⁰⁶ BROWN ET AL, *supra* note 85, at 30-31.

¹⁰⁷ See Grubb, *supra* note 102, at 472. He points out that two methods for valuing non-market goods, willingness to pay (WTP) and willingness to accept (WTA) almost always result in different figures. A reason may be that while people are limited in what they can pay to avoid damage, there is no limit on what they could demand as compensation to accept a loss they consider irreplaceable. It should also be obvious then that at a systemic level the WTP criterion is biased against the poor – they may not be able to pay much, even to avoid the loss of their livelihood.

¹⁰⁸ For detailed consideration of how economics can be reconciled with its bio-physical foundations, see essays in VALUING THE EARTH: ECONOMICS, ECOLOGY, ETHICS (Herman E. Daly & Kenneth N. Townsend, eds., 1993).

discount rate to determine at what point it is socially more beneficial to spend money on, say education, rather than increasing the share of renewable energy in order to avoid emissions of carbon dioxide, and in therefore future damages from climate change. A low discount rate results in a higher net present value for future damages, justifying more mitigation action; a high discount rate favors allocating resources to other socially useful priorities over climate change mitigation.¹⁰⁹ Far from a technicality, the selection of the discount rates has far-reaching implications for equity and the assessment of policy options.¹¹⁰ There has long been disagreement among economists on the choice of discount rate.¹¹¹ Those advocating a high discount rate justify this choice with reference to actual market behavior, in other words long-term interest rates. From an ethical perspective, it is questionable why tradeoffs made by people living now with respect to *their* present and future benefits, should be extended to trading off future benefits to others. An influential study recent study of the economics climate change, which opted for a low discount rate on equity grounds, has served to re-open the debate.¹¹² Decisions about what we owe future generations – or what they may rightly expect from us – clearly concerns fairness and equity. The same is true for the policy and economic analysis that influence and shape decision-making on this question.

Economic analyses of climate change policies assist decision-makers in understanding the cost-effectiveness of policies and their overall economic impact, including trade-offs against other goals. However, the application of cost-benefit analysis of climate change policy options may give rise to ethical concerns, as has been recognized in recent economic studies. Acknowledging the relevance of ethical concerns in policy analysis could strengthen analytical outcomes and enhance the acceptance of policy recommendations.

4.8 Equity and fairness in international law

Discussions and appeals can take place in many forums. The wider discourse is constituted by the arguments advanced as justification in the negotiations, scientific studies and reports that are marshaled in support of parties' positions, the stands taken by interest groups and non-governmental organizations, debates in the

¹⁰⁹ Damages of \$1 million 100 years in the future have a present value of \$52,000 at an annual discount rate of 3 per cent, but only \$455 at a discount rate of 8 per cent. Using the latter rate, it would be worth spending only a maximum of \$455 in the present to avoid those damages.

¹¹⁰ STERN, *supra* note 98, at 31; UNDP, HUMAN DEVELOPMENT REPORT 2007/2008, FIGHTING CLIMATE CHANGE: HUMAN SOLIDARITY IN A DIVIDED WORLD 62-63 (2007). The HUMAN DEVELOPMENT REPORT provides an excellent and accessible overview of the issues.

¹¹¹ See Kenneth Arrow et al, *Decision-making frameworks for addressing climate change*, in INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 1995: ECONOMIC AND SOCIAL DIMENSIONS OF CLIMATE CHANGE, CONTRIBUTION OF WG III (James P. Bruce et al, eds., 1996), summarizing the two sides in the debate as those favoring a descriptive discount rate, which is based on observations of the financial system (in the range of 6 per cent), and those who take a prescriptive approach, preferring a lower discount rate in relation to environmental damages, including climate change. Due to the uncertainties related to climate change, there is support for lower discount rates. See RICHARD NEWELL & WILLIAM PIZER, DISCOUNTING THE BENEFITS OF CLIMATE CHANGE MITIGATION: HOW MUCH DO UNCERTAIN RATES INCREASE VALUATIONS? (2001), Pew Center on Global Climate Change.

¹¹² Stern review, 31. But *cf.* William Nordhaus, *A review of the Stern review of the economics of global warming*, 45 JOURNAL OF ECONOMIC LITERATURE 686 (2007).

media, domestic political debates, and the arguments of encapsulated in the negotiations on proposed legal instruments or in the halls of international organizations or treaty secretariats. The following section briefly fairness in the context of international law.

4.8.1 Sources of international law

When identifying the sources of international law it is customary to refer to Article 38(1) of the Statute of the International Court of Justice, which sets out the sources of law to be applied by the Court. They are: international treaties (conventions) establishing rules expressly recognized by the parties; international custom, as evidence of a general practice accepted as law; and as a supplementary source, “general principles of law recognized by civilized nations”.¹¹³

4.8.1.1 General principles

General principles constitute a secondary source of international used for developing the law in special circumstances.¹¹⁴ They make up a “reserve store of legal principles upon which international tribunals may draw when there are no treaty rules or customary law applicable.”¹¹⁵ Drawn from domestic legal systems, examples of general principles include principles of unjust enrichment,¹¹⁶ reparation for a breach of an undertaking,¹¹⁷ *res judicata*,¹¹⁸ estopped¹¹⁹, and *nemo iudex in sua causa*.¹²⁰

Fairness as it is analyzed in this thesis must be differentiated from general principles of international law in the technical sense outlined above. Tied to the doctrine of sources, these principles are necessarily a narrow grouping, not susceptible to expansion in ordinary circumstances. By contrast, fairness may be reflected in the formation of new rules of customary international law, or as is more frequently the case, in international treaties and conventions.

International lawyers have no ready definition of fairness or justice.¹²¹ Instead, there is reference to equity under the heading of general principles of law, discussed above as one of the supplementary sources of international law and referred to above. The understanding is likewise of equity in the sense fairness and reasonableness to supplement to the more settled rules of law, in order to permit their sensible application.¹²² Akehurst in his article on equity and general principles of law distinguishes three ways in which an international judge might apply equity:

¹¹³ See THE AMERICAN LAW INSTITUTE, RESTATEMENT OF THE LAW, THIRD, FOREIGN RELATIONS LAW OF THE UNITED STATES (1987), §102; IAN BROWNLIE, PRINCIPLES OF PUBLIC INTERNATIONAL LAW, (4th ed. 1990) 3-17. Judicial decisions and the teachings of the most highly qualified publicists of the various nations are considered a subsidiary source for the determination of rules of law.

¹¹⁴ RESTATEMENT, *supra* note 113, at §102.

¹¹⁵ JOHN DUGARD, INTERNATIONAL LAW: A SOUTH AFRICAN PERSPECTIVE 36 (2nd ed. 2000).

¹¹⁶ *Diversion of Water from the Meuse (Netherlands v. Belgium)* (1937) PCIJ, Series A/B, no. 70.

¹¹⁷ *Chorzow Factory (Merits)* (1928) PCIJ, Series A, no. 17, 29.

¹¹⁸ *Effect of Awards of Compensation made by the UN Administrative Tribunal* 1954 ICJ Reports 47 at 53

¹¹⁹ *Temple of Preah Vihear* 1962 ICJ Reports 6, at 23, 31-32.

¹²⁰ *Mosul Boundary Case* (1925) PCIJ, Series B, no. 12, 32.

¹²¹ Frank Biermann, *Justice in the Greenhouse: Perspectives from International Law*, in FAIR WEATHER? EQUITY CONCERNS IN CLIMATE CHANGE 160 (Ferenc L. Tóth, ed., 1999).

¹²² BROWNLIE, *supra* note 113, at 26.

equity within the law (*infra legem*), equity as a gap filler (*praeter legem*) and equity against the law.¹²³ While the former application of equity, as a rule of interpretation is not controversial, the other two applications are much more controversial. Thus in the Continental Shelf case the ICJ held that in those cases where the court can choose between two possible interpretations, it is bound to opt for the interpretation that appears “to be closest to the requirements of justice”.¹²⁴ Equity and equitable principles have found their primary application in the continental shelf delimitation cases.¹²⁵ The principles of good unjust enrichment, estoppel (good faith) and acquiescence may also incorporate equity.¹²⁶

4.8.1.2 Customary international law

Treaty law largely consists of obligations based on consent of sovereign states. However, the creation of new rights and obligations by treaty can serve as evidence of emerging customary norms and, it is suggested, evidence of emerging principles of fairness. In contrast to treaty obligations, customary law allows for the emergence of binding norms without requiring explicit consent.¹²⁷ Consequently determination of customary international law has vexed generations of international lawyers.¹²⁸ There have also been attempts to identify structural principles relevant to the formation of customary international law.¹²⁹

Where a principle of environmental law, such as the precautionary principle, is codified in treaty law it assumes a different legal character as compared to ethical, moral or prudential principles. Yet principles have a slippery and contradictory quality – on the one hand presuming to guide action, yet on the other hand it is unclear in what circumstances they ought to be applied. Ronald Dworkin has put forward a strongly argued case for principles “trumping” policies emanating from utilitarian considerations.¹³⁰ His theory is anchored in the context of adjudication, specifically constitutional adjudication, and its practical application to international law is open to question.

There are many principles of environmental law that have not been securely anchored in treaty law. Such principles could also be considered part of international law if they are judged to have acquired the status of customary international law. The identification and validation of legal rules is quintessentially a lawyerly task, complicated in the case of custom by the complicated and decentralized structure of the international system. According to the orthodox account, “customary

¹²³ M. Akehurst, *Equity and General Principles of Law*, 25 INTERNATIONAL AND COMPARATIVE LAW QUARTERLY 801 (1976).

¹²⁴ *Continental Shelf case (Tunisia v. Libyan Arab Jamahiriya)* (Judgment) 1982 ICJ Rep. 60 (para. 71).

¹²⁵ *North Sea Continental Shelf Case* (ICJ Rep (1969). See also Franck’s extensive comment on this case, *Fairness*, *supra* note 60, at 61-65.

¹²⁶ *Fairness*, *supra* note 60, at 50-54.

¹²⁷ RESTATEMENT, *supra* note 113, at §102; BROWNLIE, *supra* note 113, at 7-11.

¹²⁸ See Martti Koskenniemi, *Hierarchy in International Law: A Sketch*, 8(4) EUROP. J. INT’L. L. 566 (1997).

¹²⁹ Michael Byers, *Custom, Power, and the Power of Rules: Customary International Law from an Interdisciplinary Perspective*, 17 MICH. J. INT’L L. 109 (1995). Byers considers how the principles of jurisdiction, personality, reciprocity and legitimate expectation qualify the application of state power in the process of customary international law.

¹³⁰ See RONALD DWORKIN, *TAKING RIGHTS SERIOUSLY* (1977) and *LAW’S EMPIRE* (1986).

international law results from a general and consistent practice of states followed by them from a sense of legal obligation.”¹³¹ The degree of generality and consistency in practice – significant regularity or uniformity – as well as demonstrating the internal element (*opinio juris*) pose problems in their application.

Scholars hewing to a restrictive approach emphasize consent and the necessity of demonstrating actual state practice, from which custom appears by means of an inductive approach.¹³² Another approach proceeds in a more deductive manner, isolating customary norms primarily by reference to statements, or *opinio juris*, such as multilateral treaties and statements in international forums such as the United Nations General Assembly.¹³³ In short, the manner in which norms attain the status of customary international law is a messy and contested question. Accordingly, Bodansky has asked whether it is really worth the effort to continue arguing whether an environmental norm is part of international law.¹³⁴ He notes that much of what is called customary international law in truth fails to meet the traditional test, and that in his view few principles of international environmental law qualify as customary law in this strict sense.¹³⁵ Rather than representing the actual state behavior, international environmental legal views reflect the “evaluative standards used by states to justify their actions and to criticize the actions of others.”¹³⁶ They constitute the language of the inter-state discourse on environmental law.¹³⁷

In the course of the above conclusion, Bodansky makes another important point, namely that most scholars writing on customary international law (and indeed, many text books) implicitly operate from the premise that international environmental disputes are likely to be the subject of judicial dispute resolution.¹³⁸ The arguments are generally framed to persuade judges, who play a still negligible role in international environmental dispute resolution.¹³⁹ (In general the scholarship on compliance has taken a turn away from judicial modes of resolution and enforcement.¹⁴⁰) Bodansky locates the primary effect of international environmental

¹³¹ RESTATEMENT, *supra* note 113, at §102.

¹³² For a forceful statement of this position, see J. Shand Wilson, *State Consent and the Sources of International Law*, 86 AM. SOC’Y INT. L. PROC. 108 (1992).

¹³³ See Anthea Elizabeth Roberts, *Traditional and Modern Approaches to Customary International Law: A Reconciliation*, 95 AM. J. INT. L. 757, 758 (2001).

¹³⁴ Daniel Bodansky, *Symposium: Customary (and not so Customary) International Environmental Law*, 3 IND. J. GLOBAL LEG. STUD. 105, 106. (1995).

¹³⁵ *Id.* at 109-113.

¹³⁶ *Id.* at 115.

¹³⁷ For an analysis of factors leading international actors select different legal forms to solve problems, see Kenneth W. Abbott and Duncan Snidal, *Hard and Soft Law in International Governance*, 54(3) INTERNATIONAL ORGANIZATION 421 (2000). On the topic of “soft law”, see COMMITMENT AND COMPLIANCE: THE ROLE OF NON-BINDING NORMS IN THE INTERNATIONAL LEGAL SYSTEM (Dinah Shelton, ed., 2000).

¹³⁸ *Id.* at 117-118.

¹³⁹ But cf. *Gabcikovo-Nagymaros Dam Case* (Hungary v. Slovakia) ICJ Rep. (1997) and the International Tribunal for the Law of the Sea (ITLOS): *MOX Plant Case (Ireland v. United Kingdom) — Order Related to Request for Provisional Measures*, No. 10 (December 3, 2001). However, compared to international criminal law, or trade law, environmental law lacks jurisprudence.

¹⁴⁰ See Abram Chayes & Antonia Chayes, *THE NEW SOVEREIGNTY: COMPLIANCE WITH INTERNATIONAL REGULATORY AGREEMENTS* (1997); Jake Werksman, *The Negotiation of a Kyoto*

norms in the context of negotiations.¹⁴¹ “In this second-party control process, international environmental norms can play a significant role by setting the terms for the debate, providing evaluative standards, serving as a basis to criticize other states’ actions, and establishing a framework of principles within which negotiations may take place to develop more specific norms, usually in treaties.” He concludes that the above functions of international environmental norms are independent of their strict legal status.

4.8.2 Equity and fairness principles in international environmental law

This section provides an overview of equity and fairness principles in selected areas of international environmental law.

4.8.2.1 Stockholm, UNCED, JPOI, CSD process

The political processes of the United Nations in the area of environment and sustainable development have made a lasting impact with respect to the introduction of fairness principles into the global debate. The Stockholm Conference on the Human Environment (UNHCE) heightened awareness of global environmental concerns, underlining the fundamental principle of regulating the use of the planet’s resources, while maintaining developmental opportunities.¹⁴² Principle 12 of the Stockholm Declaration provides for capacity-building and financial assistance for developing countries.

Twenty years later at the United Nations Conference and Environment and Development (UNCED), the concept of sustainable development, earlier advanced in the Brundtland report, came to prominence as the core principle for reconciling protection of the natural environment and economic and social development.¹⁴³ Overall, the UNCED marked a clear turn toward concerns about development. The meaning of sustainable development is difficult to pin down, which may be one reason for its wide acceptance. It has been suggested that sustainable development emphasizes “the fundamental importance of equity within the economic system.”¹⁴⁴ This interpretation is supported by Principles 3 to 9 of the Rio Declaration, where Principle 3, for instance, states that “[t]he right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.”¹⁴⁵

Agenda 21 contains the program of action to promote the implementation of sustainable development. The follow-up and review of the implementation of Agenda 21 was entrusted to the Commission on Sustainable Development (CSD), which is a functional commission of the U.N. Economic and Social Commission.

Compliance System, in IMPLEMENTING THE CLIMATE CHANGE REGIME: INTERNATIONAL COMPLIANCE 17 (O. Stokke et al eds., 2005).

¹⁴¹ BODANSKY, *supra* note 134, at 119.

¹⁴² ALAN BIRNIE & PATRICIA BOYLE, INTERNATIONAL LAW AND THE ENVIRONMENT 38 (2001, 2nd ed.).

¹⁴³ *Report of the World Commission on Environment and Development: Our Common Future* U.N. Doc. A/42/427, annex.

¹⁴⁴ *Id.* at 45.

¹⁴⁵ *Report of the United Nations Conference on Environment and Development, Annex 1*, U.N. Doc. A/CONF.151/26 of 12 August 1992.

Institutionally the CSD disappointed those who hoped for a stronger review mechanism. In practice, its reviews have not been very searching or probing, largely because its members – governments – prefer not to be scrutinized or criticized. However, unfavorable comparisons with the former U.N. Human Rights Commission,¹⁴⁶ are unfair, particularly given the widespread criticism of that Commission.¹⁴⁷ In fact, the CSD is more active and innovative than many of the other functional committees, especially with respect to securing meaningful participation from governments and to giving civil society a voice. It has also provided a platform for discussing issues in an integrated manner. An awareness of its limitations should not preclude one recognizing that it has made a normative contribution, particularly in the area of energy and environment.¹⁴⁸

4.8.2.2 International Water Law

The principles relating to international watercourses have been codified in the UN Convention on the Law of Non-Navigational Uses of International Watercourses.¹⁴⁹ The Convention is the product of 20 years of work, and in the view of one its most authoritative commentators several of the Conventions key provisions reflect customary international law.¹⁵⁰ McCaffrey writes that on the basis of state practice the following three general principles incorporated in the Convention correspond to customary norms: the obligation to use an international watercourse in an equitable and reasonable manner, to use such a watercourse in a manner not to cause significant harm to other riparian states, and to notify potentially affected riparian states of planned measures on an international watercourse.¹⁵¹ States are enjoined to utilize an international watercourse in an equitable and reasonable manner on their own territories and states “shall participate in the use, development and protection of an international watercourse in an equitable and reasonable manner”, where such participation includes the right to utilize the watercourse and the duty to cooperate to protect and develop it.¹⁵² The Convention sets out a non-exhaustive list of factors and circumstances relevant to equitable and reasonable utilization of a river, including “[t]he social and economic needs of the watercourse States concerned” and “[t]he effects of the use or uses of the watercourses in one watercourse State on other watercourse States”.¹⁵³

¹⁴⁶ See BIRNIE & BOYLE, *supra* note 142, at 52.

¹⁴⁷ The United Nations Human Rights Council replaced the Human Rights Commission in 2006. See G.A. Res. 251, March 15, 2006, U.N. Doc. A/RES/60/251.

¹⁴⁸ *Commission on Sustainable Development, Report of the on the 9th Session* (2001), U.N. Doc. E/2001/29, E/CN.17/2001/19.

¹⁴⁹ See G.A. Res. 229, May 21, 1997, Annex, U.N. Doc. A/RES/51/229; reprinted in 36 ILM 700 (1997).

¹⁵⁰ Stephen McCaffrey, *The Contribution of the UN Convention on the Law of the Non-Navigable Uses of International Watercourses*, 1 INTERNATIONAL GLOBAL ENVIRONMENTAL ISSUES 250 (2001).

¹⁵¹ *Id.* at 260.

¹⁵² art. 5.

¹⁵³ art. 6 (b) and (d).

4.8.2.3 Law of the Sea

Franck details how the Law of the Sea negotiations moved away from the principle of equidistance in maritime delimitations to embrace equity.¹⁵⁴ Article 83(1) of UN Convention on the Law of the Sea (UNCLOS) states:¹⁵⁵ “The delimitation of the continental shelf between States with opposite or adjacent coasts shall be effected by agreement on the basis of international law, as referred to in Article 38 of the Statute of the International Court of Justice, in order to achieve an equitable solution.”

UNCLOS provisions concerning transfer of technology¹⁵⁶ to developing countries, access and freedom of transit for land-locked states,¹⁵⁷ and those relating to the resources of the seabed¹⁵⁸ also reflect equity and fairness principles. The 1995 Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks requires that recognition be given to the special requirements of developing States in relation to conservation and management of fish stocks, *inter alia*, by ensuring that such measures do not result in a disproportionate burden of conservation action for developing countries and that developing States, in particular the least-developed among them and small island developing States, obtain assistance to enable them to participate in high seas fisheries.¹⁵⁹

4.8.3.4 Montreal Protocol

In the course of the Montreal Protocol negotiations developing nations, pointing to the fact that industrialized countries had been responsible for the overwhelming share of ozone-depleting chlorofluorocarbons (CFCs), took the position that they should not be subject to the same controls as wealthier countries.¹⁶⁰ Consequently, Protocol makes specific provision for the circumstances of developing countries in the form of an exemption, technology of transfer and a fund to meet the incremental cost of switching to non-CFC substitutes.¹⁶¹ For

¹⁵⁴ Fairness, *supra* note 60, at 66-68. See Geneva Convention on the Continental Shelf, April 29, 1958, art. 6, 499 U.N.T.S. 311, 315 defining principle of equidistance as follows: “Where the same continental shelf is adjacent to the territories of two or more States whose coasts are opposite each other, the boundary of the continental shelf appertaining to such States shall be determined by agreement between them. In the absence of agreement, and unless another boundary line is justified by special circumstances, the boundary is the median line, every point of which is equidistant from the nearest points of the baselines from which the breadth of the territorial sea of each State is measured.”

¹⁵⁵ United Nations Convention on the Law of the Sea, December 10, 1982, 21 ILM 1261, 1286, 1833 U.N.T.S. 3.

¹⁵⁶ arts. 266-278.

¹⁵⁷ arts. 124-132.

¹⁵⁸ arts. 133-149.

¹⁵⁹ Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, arts. 24-25, 2167 U.N.T.S. 3, U.N. Doc. A/CONF.164/37.

¹⁶⁰ CASS R. SUNSTEIN, MONTREAL VERSUS KYOTO: A TALE OF TWO PROTOCOLS 15 (AEI-Brookings Joint Cent. for Reg. Studies Working Paper No. 06-17, 2006).

¹⁶¹ Montreal Protocol on Substances that Deplete the Ozone Layer, September 16, 1987, 26 ILM 1541, 1522 U.N.T.S. 3. The text of Montreal Protocol as amended is available on the website of the Ozone Secretariat at <http://www.unep.org/ozone/pdfs/Montreal-Protocol2000.pdf>.

instance, under Article 5 developing parties are permitted to meet “basic domestic needs” by delaying the implementation of control measures. The Multilateral Fund established under the Protocol provides financial resources for the closure or conversion of facilities producing ozone-depleting substances (ODS), technical assistance, information dissemination, and capacity building aimed at phasing out ODS use in a broad range of sectors.¹⁶² Over the period from 1991 to 2007 donors have pledged US\$ 2.2 billion.¹⁶³ These provisions contributed to a negotiated agreement in which fairness played an openly acknowledged part.¹⁶⁴

4.9 Conclusion

Equity and fairness concerns are reflected in the Framework Convention itself. Equity is considered explicitly in many of the proposals for a post-Kyoto climate agreement.¹⁶⁵ This chapter has examined how selected understandings of fairness and equity are relevant to the problem of climate change. This revealed that is not desirable to attempt to construct a universal theory applicable to all facets fairness. Rather, the aim was to identify principles that could form the basis for a working consensus relating relevant to allocating responsibility for combating climate change. The objective is to identify principles that can be applied in the evaluating, on fairness and equity grounds, actual proposals for a post-2012 climate agreement. The core principles identified and discussed were equality (egalitarian), responsibility, capability and need.

The approach taken did not seek deny the role of perceived self-interests in determining the actions of states in international climate negotiations. Instead, it was argued that equity and fairness considerations can and do play a significant role in development of climate change law. Equity considerations are frequently mentioned in the literature, particularly with respect to mitigation arrangements. International law and the international community, are, at best, in an early, sometimes faltering, state. Nonetheless, international environmental law is predicated to a significant degree on common responsibility and a nascent sense of community. Furthermore, not only is there an overt fairness discourse in this area of law, but in fact various elements of fairness have been concretized in legal principles.¹⁶⁶ The analysis of equity and fairness principles in the climate change regime is the subject of the next chapter.

¹⁶² art. 10

¹⁶³ See website of the Ozone Secretariat, http://www.multilateralfund.org/about_the_multilateral_fund.htm, last visited 2 February 2008.

¹⁶⁴ Fairness, *supra* note 60, at 386.

¹⁶⁵ Perhaps most prominently the Contraction and Convergence proposal, put forward by the Global Commons Institute, see <http://www.gci.org.uk/contconv/cc.html>.

¹⁶⁶ Lasse Ringius, Asbjørn Torvanger & Arild Underdal, *Burden Sharing and Fairness Principles in International Climate Policy*, 2(1) INTERNATIONAL ENVIRONMENTAL AGREEMENTS: POLITICS, LAW AND ECONOMICS 1 (2002).

Chapter 5 - Equity and fairness in the climate change regime

5.1 Introduction

This chapter consists of a closer analysis of the Convention and the Protocol, with a view to identifying provisions and aspects in these instruments that have a bearing on fairness and equity. The principle of common but differentiated responsibilities is analyzed in the context of its development under international law. The chapter identifies the transfer of cleaner technology and financial assistance as examples of differentiation under international environmental law; in this respect, the implementation of the relevant provisions under the Convention and Protocol are detailed and analyzed.

The preamble to the Convention stakes out the terrain to be covered. The language of the preamble is more expansive than the dryer terms of the Convention itself. If the Convention text has been pared down to a mutually acceptable minimum, then the preamble does give a taste of the bigger themes and issues lost in the process of drafting. In particular, the preamble is striking for the prominence it gives to issues of fairness and justice – in that sense it correctly signals their primary importance. The preamble states that: “*Noting* that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and developmental needs”.¹ Prominent reference is made to the principle of common but differentiated responsibilities.² The special vulnerability to the impacts of climate change low-lying, small-island developing countries, and other developing countries is recognized.³ It is also recognized that in order to achieve sustainable social and economic development, the energy consumption of developing countries will have to grow.⁴

The preamble is written in the hortatory language typical of such passages. As such it has no binding legal status, but it could be of assistance in interpreting the text. Under the provisions relating to the interpretation of treaties the preamble forms part of the context in which the terms of an instrument are interpreted.⁵ The preamble maps out the debate around fairness and equity – the recognition that climate change potentially threatens everyone – it s common concern of humankind – yet at the same time developing countries insist that historically they have

¹ United Nations Framework Convention on Climate Change, *adopted on May 9, 1992*, prmb. para. 3, 1771 U.N.T.S 164 Article 3(1) [UNFCCC].

² *Id.* prmb. paras. 6, 23.

³ *Id.* prmb. para. 24. Also mentioned, in paras. 25-26, is the vulnerability of countries “whose economies are particularly dependent on fossil fuel production”, that is the OPEC states. This a reflection of the negotiating dynamics and the kinds of compromise extracted in order to reach agreement.

⁴ *Id.* prmb. para. 27.

⁵ Vienna Convention on the Law of Treaties, May 23, 1969, art. 31, 1155 U.N.T.S., 331. It states: “1. A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose. 2. The context for the purpose of the interpretation of a treaty shall comprise, in addition to the text, including its preamble and annexes...”

contributed very little to the problem, and hence it is only fair and equitable that they be allowed to develop, allowing those with the greatest responsibility to bear the heaviest burden. As we have seen, theories and conceptions of ethics and justice abound. Applied to the issue of climate change they yield a variety of answers. These theoretical possibilities aside, the text of the Convention narrows the field of choices down very considerably. The principle of common but differentiated responsibilities is firmly entrenched in the Convention; it proved critical to launching the Berlin Mandate that culminated in the Protocol. At present there is no indication whatsoever that any major developing country is prepared to accept a binding cap on emissions in the near future – the need for development is simply too urgent. Per capita emissions in developing countries – including major emitters such as China and India – remain far lower than those of Annex 1 countries. For many small countries, the promise of assistance – for adaptation or technology transfer – under the Convention and Protocol has proved disappointing. At the same time, many of those countries vulnerable to the impacts of climate change – small island developing states, countries prone to drought and desertification – have found the changes occurring under the rubric of economic globalization to have brought them limited benefits, or even contributed to a further decline in their economic prospects.⁶ And after declining in the 1990s, levels of development assistance have begun to rise modestly in the past few years.⁷ The international community has also pledged to fulfill the Millennium Development Goals, which aim for the achievement of eight development-related goals by 2015, including halving the number of people whose daily income is less than \$1 per day, achieving universal primary education and ensuring environmental sustainability.⁸ While progress has been notched up in Asia, it appears likely that sub-Saharan Africa will not be able to meet key goals relating poverty and the number of people suffering from hunger.⁹ For instance, although over the period 1990 to 2000 the percentage of people in sub-Saharan Africa living in absolute poverty declined marginally, the absolute number of those in extreme poverty rose by 140 million.

⁶ For instance Africa's declining share of world trade stands at only 1.5 per cent, and while recent years have seen economic growth, this has been driven by commodities (minerals, hydrocarbons) exports. For instance, oil and other fuels accounted for almost 60 per cent of Africa's exports in 2005. See OECD, *AFRICAN ECONOMIC OUTLOOK 2007* (2007). Changes in the world trading system, particularly the phasing out of market access preferences, are impacting negatively on a number of small island developing states that have achieved a degree of prosperity, e.g. Antigua and Barbuda (sugar industry) and Mauritius (textiles).

⁷ According to the Development Assistance Committee of the OECD, its 22 member countries, the world's major donors, provided US\$103.9 billion in aid in 2006, down by 5.1 per cent from 2005. This represents a significant increase over the low of recorded in 1997. Nonetheless, the DAC points out that aid to sub-Saharan Africa, excluding debt relief, was static in 2006, leaving a challenge to meet the Gleneagles G8 summit commitment to double aid to Africa by 2010. See OECD, *FINAL AID FLOWS IN 2006*, DCD/DAC/RD(2007)15/RD2 (2007), http://www.oecd.org/departement/0,2688,en_2649_34447_1_1_1_1_1,00.html (last accessed 4 February 2008).

⁸ See <http://www.un.org/millenniumgoals/> (last accessed 17 May 2007). The MDGs were derived from the Millennium Declaration, adopted by the United Nations in G.A. Res. 2 of 8 September 2000, U.N. Doc A/RES/55/2.

⁹ See UNITED NATIONS, *MILLENNIUM DEVELOPMENT GOALS REPORT 2007* 4 (2007), <http://www.un.org/millenniumgoals/pdf/mdg2007.pdf> (last accessed 4 February 2007).

The account of the negotiations provided in an earlier chapter also supports the argument that there are signs of a convergence towards what would be regarded as a fair and equitable approach to combating climate change. While no agreement on how to share the burden of combating climate change is apparent, some things are clear. Under the provisions of the Convention, developed countries must take the lead in combating climate change.

This chapter will examine the “revealed” fairness and equity aspects present in the climate regime. As sketched out above, the argument is that although agreement on the future of the climate change instruments is presently lacking, an understanding and creative (re-)interpretation of the central provisions of the Convention points to the elements of a future agreement on international climate policy. It is therefore false to contend that there is no starting point for discussions on fairness and equity. The chapter begins with a brief overview of differentiation under international environmental law, in particular the principle of common but differentiated responsibilities as manifested in the Convention. The conceptual underpinning of the principle and its relationship with equity and fairness are examined. The two sections that follow this theoretical discussion discuss differentiation in action in the climate change regime, namely the implementation of provisions of the Convention relating to the transfer of technology to developing countries and the provision of financial assistance to combat climate change.

5.2 Differentiation – entry point for fairness and equity or instrument of expediency?

Fairness or equity frequently concerns the division or sharing of something. Thus, international fairness or equity can be described as a fair or equitable sharing among countries of burdens and benefits.¹⁰ An earlier chapter analyzed three dimensions – equality, responsibility and capability – that inform and underpin the concepts of equity and fairness. The question of the division of burdens under global climate change is of course at the heart of fairness in this context.

The emergence of differential treatment must be seen against a broader context in which differential treatment arose. A historical impetus for the development of differential treatment in international law was the expansion in membership of the state system with the process of decolonization after the Second World War.¹¹ In parallel, the world has experienced a greater degree of interdependence through growth in trade, investment and changes in technology. The post-WWII state system also saw the rise of international institutions concerned with the economic interactions of states in the form of the Bretton Woods institutions, the International Monetary Fund and the World Bank. The emergence of global environmental problems also created a demand for new norms intended to promote collective responses by states with widely diverging interest and capabilities. Early examples of differentiation in international law existed in the trade law,¹² the

¹⁰ See PAUL G. HARRIS, WHAT'S FAIR? – INTERNATIONAL JUSTICE FROM AN ENVIRONMENTAL PERSPECTIVE (Working Paper, Columbia International Affairs Online, CAIO, 1999).

¹¹ Philippe Cullet, *Differential Treatment in International Law: Towards a New Paradigm of Inter-state Relations*, 10 EJIL 549, 564 (1999).

¹² General Agreement of Tariffs and Trade, October 30, 1947, 55 U.N.T.S. 187. Part IV recognized the disadvantaged position of less developed countries, stating in art. XXXVI, sub-para. 8, that: “The

United Nations Law of the Sea Convention,¹³ and the movement to establish a New International Economic Order.¹⁴

The 1972 Stockholm Declaration emphasized the need to consider "the applicability of standards which are valid for the most advanced countries but which may be inappropriate and of unwarranted social cost for the developing countries."¹⁵ But it was the Rio Conference in 1992 that was conspicuous for its endorsement of the differentiated responsibilities between developed and developing countries.¹⁶ Special concern for the needs of developing countries and the differentiation was articulated in Principles 6 and 7 of the Rio Declaration, which state that:¹⁷

developed contracting parties do not expect reciprocity for commitments made by them in trade negotiations to reduce or remove tariffs and other barriers to the trade of less-developed contracting parties." This provision was in essence more an exhortation to "good practice" and lacked binding force. See ALEXANDER KECK & PATRICK LOW, SPECIAL AND DIFFERENTIAL TREATMENT IN THE WTO: WHY, WHEN AND HOW? 4 (WTO, Staff Working Paper ERSD-2004-03, May 2004), available at http://www.wto.org/english/res_e/reser_e/ersd200403_e.htm. The *Decision on Differential and More Favourable Treatment, Reciprocity and Fuller Participation of Developing Countries*, Decision of 28 November 1979, (L/4903), provides for certain aspects of regional or global preferential agreements among developing countries, for special treatment for least-developed countries, and restates the principle of non-reciprocity (available at http://www.wto.org/english/docs_e/legal_e/prevto_legal_e.htm). The Doha Declaration calls for a review of all special and differentiation provisions "with a view to strengthening them and making them more precise, effective and operational", para. 44. See *Ministerial Declaration*, adopted on 14 November 2001, WT/MIN(01)/DEC/1, available at http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm. More specifically, the decision on implementation-related issues and concerns calls for Members "to consider the legal and practical implications for developed and developing Members of converting special and differential treatment measures into mandatory provisions, to identify those that Members consider should be made mandatory", para. 12(i). See *Implementation-related issues and concerns*, decision of 14 November 2001, WT/MIN(01)/17, available at http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_implementation_e.htm. However, little action has been taken advance Doha agenda in this respect. It is difficult to avoid the conclusion that under the GATT/WTO there has been a move toward the elimination of differentiation, with provision for procedural differentiation, such as longer time periods for the phasing in of rules, as well as technical assistance. Renewed efforts to secure special and treatment – exemplified by the Doha agenda – seem bogged down.

¹³ See United Nations Convention on the Law of the Sea, December 10, 1982, Part XI, 1833 U.N.T.S. 3, 21 ILM 1261. But cf. Agreement relating to the implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December, G.A. Res. 263, 48th Sess., U.N. Doc., A/RES/48/263, Annex. The text of the Agreement is available at http://www.un.org/Depts/los/convention_agreements/convention_overview_part_xi.htm.

¹⁴ The New International Economic Order (NIEO) constituted an attempt by the developing countries to bring about changes in the international economic and legal system, with an emphasis on control of developing countries over their natural resources. See MOHAMMED BEDJAOUI, TOWARDS A NEW INTERNATIONAL ECONOMIC ORDER (1979). The calls for the establishment of the NIEO faded away by the end of the 1980s. See Cullet, *supra* note 11, at 568.

¹⁵ *Report of the United Nations Conference on the Human Environment*, U.N. Conference on the Human Environment, 26th Sess., princ. 23, U.N. Doc. A/CONF.48/14 (1972); 11 I.L.M. 1416, 142.

¹⁶ Duncan French, *Developing States and International Environmental Law: The Importance of Differentiated Responsibilities*, 49 INT'L & COMP. L.Q. 35 (2000).

¹⁷ *Declaration of the United Nations Conference on Environment and Development*, UN Doc. A/CONF.151/26(Vol.I), annex.

“The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given priority...” (Principle 6)

“States shall cooperate in the spirit of global partnership to conserve, protect and restore the health and integrity of the Earth’s ecosystem. In the view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.” (Principle 7)

Following Rajamani, differential treatment in international environmental agreements can be divided into three broad categories as follows: (a) provisions that differentiate between developed and developing countries with respect to the central obligation of the instrument in question; (b) differentiation with respect to implementation, for instance phased-in compliance and delayed reporting schedules; and (c) the granting of assistance in the form of capacity building, financial resources, and transfer of technology.¹⁸ As regards provisions establishing differentiation concerning the central obligations, prime examples are the article 4(2) of the UNFCCC, which sets out the commitments of developed countries, and the Kyoto Protocol, which establishes emission limitation and reduction commitments for the countries contained in its Annex B.¹⁹ Provisions that differentiate between developed and developed countries with respect to implementation are far more common than those falling under the first category. For instance, the UNFCCC²⁰, the Convention on Biological Diversity,²¹ the Desertification Convention,²² the 1994 International Tropical Timber Agreement (ITTA),²³ the 1995 Agreement on Straddling Fish

¹⁸ LAVANYA RAJAMANI, DIFFERENTIAL TREATMENT IN INTERNATIONAL ENVIRONMENTAL LAW, 93-94 (2006). See also French, *supra* note 16, at 39-41, identifying two broad categories, namely applying a standard for developing countries that takes account of their special needs, as well as provisions relating to financial assistance and access to technology.

¹⁹ Kyoto Protocol to the United Nations Framework Convention on Climate Change, December 11, 1997, 37 I.L.M. 22, text available from the website of the UNFCCC secretariat, http://unfccc.int/kyoto_protocol/items/2830.php.

²⁰ See for example art. 3(1), “...the developed country parties should take the lead in combating climate change and the adverse effects thereof.”

²¹ Convention on Biological Diversity, June 5, 1992, 1760 U.N.T.S. 79. See *prmb.* para. 16 “[a]cknowledging further that special provision is required to meet the needs of developing countries”. In relation to research and training, article 12 provides that the contracting Parties shall take into account the “special needs of developing countries”.

²² United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, October 14, 1994, 1954 U.N.T.S. 3, 33 I.L.M. 1238. Compare *prmb.* para. 4 asserting “...desertification and drought are problems of global dimension in that they affect all regions of the world and that joint action of the international community is needed to combat desertification” and *prmb.* para. 5 noting the particular impact of drought and desertification on developing countries, particularly in Africa. See also references to needs of developing countries in arts. 3(d), 4(2)(b), 5, and 6. Article 7 introduces further differentiation, stating that in implementing the Convention Parties shall give priority to African countries.

²³ International Tropical Timber Agreement, January 26, 1994, 1955 U.N.T.S. 81, 33 I.L.M. 1016. Under art. 34 on special measures, providing the developing country Parties can apply for “appropriate differential and remedial measures”.

Stocks²⁴ provisions that recognize the special needs and circumstances of developing countries. The Montreal Protocol is a well-known example of delayed, or phased-in compliance with its requirement to cease the production and use of ozone depleting substances. Provisions relating to financial assistance in the United Nations Framework Convention on Climate Change,²⁵ Convention on Biodiversity²⁶ and the Stockholm Convention on Persistent Organic Pollutants²⁷ are operationalized through the Global Environmental Facility. Examples of provisions concerning access to, or transfer of, technology on favorable terms are found in the UNFCCC and Convention to Combat Desertification.²⁸ Statements endorsing differentiation are also found in the non-binding documents adopted at the Rio Conference: Agenda 21,²⁹ the Rio Declaration of Principles³⁰, and the Statement on Forests.³¹

5.2.1 Common but differentiated responsibilities in the UNFCCC

The principles in Article 3 of the Climate Change Convention consist of a particularly clear elaboration of the principle of common but differentiated responsibilities and the special needs of developing countries, particularly on account of their vulnerability to the adverse effects of climate change:

“1. The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their

²⁴ Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 2167 U.N.T.S. 3, U.N. Doc. A/CONF.164/37. *See* prmb. para. 8, recognizing the need for specific assistance to developing countries to permit them to participate fully in the conservation, management and so forth of fish stocks. In particular the “special requirements of developing countries in relation to the conservation and management” of fish stocks, including “the need to ensure that such measures do not result in transferring, directly or indirectly, a disproportionate burden of conservation action onto developing States.” (art. 24(1) and 24(2)(c). Also art. 26 providing for special assistance to developing countries in the implementation of the Agreement.

²⁵ UNFCCC, art. 11.

²⁶ *Supra* note 21, art. 21.

²⁷ Stockholm Convention on persistent organic pollutants, May 22, 2001, art. 13, text available on the website of the secretariat, <http://www.pops.int/>.

²⁸ *See* arts. 4 and 18, respectively.

²⁹ UN Doc. A/CONF.151/26/(Vol.I), Annex 3, *Agenda 21*. *See* for instance chapter 9, Protection of the Atmosphere, stating that activities undertaken in pursuit of the objectives of the chapter should take into account “the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty” (para. 9.3). A general reference to differentiation is found in para. 39.3(d), noting that in drawing up international standards States should “take into account the different situations and capabilities of countries”.

³⁰ *Supra* note 17.

³¹ *Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests*, UN Doc. A/CONF.151/26 (Vol. III), Annex 3. Developed countries are to take the lead in greening and afforestation (principle 8(a)), efforts of by developing countries and countries with economies in transition to strengthen sustainable forest management should be supported (principle 9(a)). On 17 December 2007 the United Nations General Assembly adopted the *Non-legally binding instrument on all types of forests*, *see* G.A. Res. 89, 62nd Sess., U.N. Doc. A/RES/62/98. The Instrument references the principle of common but differentiated responsibilities and makes calls attention to the need for financial and technical assistance for forest conservation and management in developing countries.

common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse impacts thereof.

2. The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.”

The close proximity of the provisions on the special needs of developed countries and the principle of differentiation points to the connection between them. The phrasing as a principle intended to guide the parties, as well as “should” rather than “shall”, indicates that it the obligation to protect the climate system should not be understood in binding legal terms. At the time of drafting, developed countries had argued that developing countries should assume the lead in combating climate change because they – through their high per capita energy consumption – historically bear the main responsibility for the rising concentrations of greenhouse gases.³² The attempt to include language to this effect was unsuccessful, and the reference to “respective capabilities” was inserted to underline that capabilities – rather than the differential contribution to global emissions – are the reason for developed countries taking the lead in combating climate change.³³ (Language referencing the responsibility of developed countries is found in paragraph three of the preamble, which states “[t]hat the largest share of historical and current global emissions of greenhouse gases has originated in developed countries...”.) The phrase “take the lead in combating climate change” now refers directly to “respective capabilities”, not the historically unequal share of greenhouse gas emissions, which serves to undermine the responsibility element.

The principle of common but differentiated responsibilities finds concrete application in a number of the Convention’s provisions. Thus, the commitments enumerated under article 4 are qualified in that parties are to take into account “their common but differentiated responsibilities”. Further, under article 4(2) only the industrialized countries (Annex 1) committed themselves to the “aim of returning...to their 1990 levels” their emissions of greenhouse gases.³⁴ Similarly, it is the Annex 1 countries who “shall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting [their] anthropogenic emissions of greenhouse gases...”³⁵ Reporting requirements are differentiated, with

³² Daniel Bodansky, *The United Nations Framework Convention on Climate Change: A Commentary* 18 YALE J. INT. L. 451, 498(1993).

³³ *Id.* at 503. He notes that developing countries wanted developed countries to take the lead because they bear the main responsibility for climate change.

³⁴ UNFCCC, *supra* note 1, art. 4(2)(b).

³⁵ *Id.*, art. 4(2)(a).

Annex 1 parties also required to report more frequently.³⁶ Special consideration for the needs of developing countries recurs in a number of articles.³⁷

Another provision in assessing the embedding of the principle of common but differentiated responsibilities is article 4(7), which states that:

“The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties.”

This provision represents an attempt to condition the fulfillment by developing countries of their obligations on financial and technology support by the developed countries.³⁸ Since the part relating to the fulfillment by developing countries is stated in factual terms, the language in the Convention, watered down from earlier proposals, does not fully convey the originally intended meaning.

The force of differentiation in action is seen in the Kyoto Protocol, which saw its genesis in the Berlin Mandate where developed countries eschewed targets for developing countries. Nothing less would have permitted the negotiations to move ahead. Since then, developing countries are careful to refer to this principle in all contexts where obligations, real or potential, are discussed. This is true also for non-binding instruments adopted under the auspices of organs of the United Nations.³⁹

³⁶ Under article 12, non-Annex 1 parties have three years to submit their initial communication, or upon the availability of financial resources, sufficient to cover the full cost of reporting, from developed country parties. Least developed country (LDC) parties may report at their discretion. Annex 1 parties are required to submit reports on a yearly basis.

³⁷ See article 4, sub-para. 4 (assistance of developing countries particularly vulnerable to adverse effects of climate change); 8 (full consideration of actions necessary to meet the specific needs of developing countries); and 9 (specific needs and of least developed countries in relation to funding and technology transfer).

³⁸ See Mark A. Drumbl, *Poverty, Wealth, and Obligation in International Law* 76 TUL. L. REV. 843 (2002). He analyses this and similar provisions in terms of “shared compact” between developed and developing countries. Similar provisions exist in a number of MEAs, see for instance art. 20(4) of the Convention on Biological Diversity, which replicates the language of art. 4(7) of the UNFCCC.

³⁹ *Report of the Global Conference on the Sustainable Development of Small Island Developing States*, chap. 2, Programme of Action for the Sustainable Development of Small Island Developing States, UN Doc. A/CONF./167/9, 6 May 1994. Para. 14 refers to Principle 7 of the Rio Declaration in the context of addressing global environmental degradation. *Report of the Ninth Session of the Commission on Sustainable Development*, 1, Decision 9/1, Energy for Sustainable Development, at paras. 5, 7; at 15, Decision 9/2, Protection of the Atmosphere, para. 1. *Report of the World Summit on Sustainable Development*, UN Doc. A/CONF./199/20, chap. 1, 6, Johannesburg Plan of Implementation. For instance, the principle of common but differentiated responsibilities as set out in Principle 7 of the Rio Declaration is referred to in paras. 14 (production and consumption), 20 (energy for sustainable development), 38 (climate change), 39 (air pollution) 81 (implementation). Mauritius Strategy for the further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, *Report of the International Meeting to Review the Programme of Action for the Sustainable Development of Small Island Developing States*, UN Doc. A/CONF./207/11, 14 January 2005, chapter 1, at 10. Para. 18(2)(b) where the Mauritius Strategy provides that the international community should “[c]ontinue to take, in accordance with the Convention and the Kyoto Protocol, as applicable, steps to address climate change, including through: adaptation and mitigation in accordance with the principle of common but differentiated responsibilities and respective capabilities...” Principle 7 of the Rio Declaration is

5.2.2 Legal status of the principle of common but differentiated responsibilities

The consensus on the legal status of the principle of common but differentiated responsibilities appears to be that it is an important principle of international environmental law, but that it has not attained the status of general customary international law.⁴⁰ However, it would be difficult to deny the special status and importance of the principle in international environmental law, as evidenced by its presence in the UNFCCC⁴¹ and other agreements, as well as references in “soft law” instruments and decisions and resolutions of United Nations organs.⁴² The establishment of new obligations under international environmental law, or the deepening of existing ones, would prove difficult – and be perceived as inequitable – without taking into account the principle. Therein lies its real significance.

5.2.3 Conceptual framework and philosophical roots of common but differentiated responsibilities

The conceptual framework for differentiation in international environmental law has been approached from a number of angles. In general, differentiation can be regarded, at its most positive, as a manifestation of resolve to tackle common problems, motivated by partnership and cooperation.⁴³ Differentiation of responsibilities is thus identified as one aspect of an emerging “shared compact” between developed and developing countries, with the latter conditioning their participation in global environmental agreements on assistance from the former.⁴⁴ Scholars argue that differentiation does the following in international law: first, promotes the achievement of substantive equality among states, by recognizing the

referred to elsewhere in the text, at para. 3 (specific expression of principle required for Small Island Developing States) and 83 (implementation). See *Non-legally Binding Instrument on All Types of Forests* preambular para. 4, reaffirming commitment to Rio Principle 7, *supra* note 31. The principle has also been recalled in successive General Assembly resolutions in the context of climate change. See for instance G.A. Res. 54/222 of 22 December 1999, UN Doc. A/RES/54/222, para. 2 and decision 55/443 of 20 December 2000, GAOR., Supp. 49. See also G.A. Res. 55/443 of 56/199 of 21 December 2001, UN Doc. 56/199, para. 2 (calling on “all States parties to continue to take effective steps to implement their commitments under the Convention, in accordance with the principle of common but differentiated responsibilities...”); 57/257 of 20 December 2002 UN Doc. A/RES/57/257, prmb. para. 3; 58/243 of 23 December 2003, UN Doc. A/RES/58/243, prmb. para. 2; 59/234 of 22 December 2004, UN. Doc. A/RES/59/234, prmb. para. 2.

⁴⁰ See Cullet *supra* note 11, at 578-579; Yoshiro Matsui, *Some Aspects of the Principle of “Common but Differentiated Responsibilities”*, 2 INTERNATIONAL ENVIRONMENTAL AGREEMENTS: POLITICS, LAW AND ECONOMICS 151, 167 (2002); RAJAMANI, *supra* note 18 at 158-160; Christopher D. Stone, *Common but Differentiated Responsibilities in International Law*, 98 A.J.I.L. 276, 300 (2004).

⁴¹ The principle is also referred to in the decisions of Conference of the Parties (COP), including in the decisions to implement the Kyoto Protocol. See for instance decision 24/CP.7 (procedures and mechanisms relating to compliance), in *Report of the Conference of the Parties on its Seventh, Addendum, Part II: Action taken by the parties*, vol. III, FCCC/CP/2001/13/Add.3.,

⁴² For a partial list of references to the principle in soft law instruments and United Nations General Assembly resolutions on climate change, see *supra* note 39.

⁴³ But *cf.* the analysis of Stone, *supra* note 40.

⁴⁴ See Drumbl, *supra* note 38.

different needs and circumstances of developing countries, second, fosters partnership and cooperation among states, and, third, promotes effective implementation of agreements.⁴⁵ The above grounds for differentiation, it is contended, have gained in currency as compared to reasoning based on the historical responsibility of the developed world for the bulk of global environmental problems, as well as its capacity (in contrast to the developing nations) to remedy them.⁴⁶ Certainly in the climate change context it would be incorrect to maintain that ascriptions of responsibility based on past conduct have been superseded as a dominant strain of argument. Nonetheless, an approach based on partnership and cooperation was heralded in *Agenda 21* and, in more hedged fashion, the major legal instruments adopted at the Rio Conference. The impasse around climate change signals that the earlier vision and optimism has frayed. The same authors who discern partnership and cooperation as one of the grounds for differentiation are also clear-eyed in noting that while differentiation arguably rests on concerns of fairness, it could also be characterized as expediency in ensuring that developing countries act on what are – for the time being – largely Northern concerns.⁴⁷

As appears from the formulation of Principle 7 of the Rio Declaration, the differentiated responsibility is ostensibly grounded in the different contributions to global environmental degradation on the one hand, and on the other greater financial resources and capacities of the developing nations.⁴⁸ The two grounds for responsibility also neatly reflect the divide between the camps – developing countries favor the first, as it could conceivably give rise to legal obligations, developed countries naturally favor the second ground, perceived as weaker because resting on moral and political grounds, essentially akin to charity.⁴⁹ A more positive perspective on the argument from relative capacities could hold that developing countries should be granted the opportunity to achieve economic and social development before assuming the full burden of environmental protection obligations in question.⁵⁰ The

⁴⁵ See Cullet *supra* note 11, at 550; French, *supra* note 16, at 35, 46.

⁴⁶ French, *supra* note 16, at 35, 46.

⁴⁷ *Id.* at 35. Both French (*supra* note 16, at 57), Cullet (*supra* note 11, at 574) and Drumbl (*supra* note 38, at 930-932) conclude that developed countries have been most accommodating to Southern demands for differentiation and financial support in areas where they perceive their interests to lie, for example climate change. By contrast, the United Nations Convention to Combat Desertification, which covers an issue primarily of concern to developing countries, contains softer language on differentiation and has in general received less prominence than the UNFCCC and the CBD. See Drumbl, *supra* note 38, at 932-933.

⁴⁸ LAVANYA *supra* note 18, at 137-150. See also Matsui, *supra* note 40, at 155. As Matsui notes, this position is shared by most writers on the topic. See for instance Cullet, *supra* note 11, at 577; French, *supra* note 16, at 46-52. See also Ileana M. Porras, *The Rio Declaration: A New Basis for International Cooperation*, in GREENING INTERNATIONAL LAW 25, 29 (Philippe Sands, ed., 1993).

⁴⁹ Illustrative of the perceived power of norms – even the soft-law variety – the United States issued an interpretative statement to the effect that Principle 7 merely acknowledged the “special leadership role of developed countries” due to their “wealth, technical expertise and capabilities” and that the principle does not “imply a recognition...of any international obligations...or any diminution in the responsibility of developing countries.” Cited by French, *supra* note 16, at 37. See UN Doc. A/CONF.151/26 (Vol.IV) (1992), 20.

⁵⁰ *Cf.* INTERNATIONAL LAW ASSOCIATION, REPORT OF THE SIXTY-SIXTH CONFERENCE 116 (1995), rejecting this ground and arguing for responsibility on the basis of “different contributions to global environmental degradation”.

relative wealth and historical contribution of States to the problem can be regarded as a salient reason to permit differential treatment.

The principle of common but differentiated responsibilities gives effect to conceptions of equity and fairness in international environmental law and policy-making. It does so first as a normative principle, for example as articulated in Rio Principle 7, and subsequently re-affirmed in documents such as the Johannesburg Plan of Implementation, adopted at the World Summit on Sustainable Development in 2002. Second, it gives effect to conceptions of fairness and equity when in concrete provisions, for instance in the differentiated emission limitation and reduction commitments of the Kyoto Protocol. The philosophical roots of common but differentiated responsibilities have been traced to notions of equality and of restoring equality⁵¹, as well as the concept of intergenerational equity.⁵² Scholars have also identified the justifications for the principle, primarily the dichotomous responsibility and capacity/capability grounds,⁵³ and extended to include taking into account the special needs and circumstances of developing countries and a “global partnership” featuring more equitable forms of cooperation.⁵⁴

It is suggested that this approach is correct, but does not go far enough. In fact, common but differentiated responsibilities can be better understood by going one step further to explicitly identify the notions of equity and fairness that underpin the principle. These are the inter-linked aspects of fairness and equity that have been discussed in an earlier chapter: equality, responsibility and capability. It is no coincidence that these aspects of fairness and equity also correspond to the various-at times competing - characterizations of common but differentiated responsibilities. In a very broad sense, quality demands that “like cases be treated alike”, but this begs the question what criteria determine similarity and dissimilarity in a given case. In this respect a more substantive and contextualized understanding of equality proves useful. As opposed to formal equality, which stresses neutrality, the promotion of substantive equality entails enquiring into which factors count in determining whether cases ought to be treated in a like manner.⁵⁵ In the context of the climate change, equality in tackling the burden of combating climate change is contextualized and supported by the notion of responsibility. Equal sharing of the mitigation burden between developed and developing countries is unfair and inequitable when the respective responsibilities for atmospheric GHG concentrations are accounted for. Nonetheless, as noted in the analysis of the responsibility aspect of fairness, industrialized countries’ historical contribution to the “bad” of climate change should also be seen in the light of the global public goods, such as advances in

⁵¹ RAJAMANI, *supra* note 18, at 150-151, 154-155.

⁵² Cullet, *supra* note 11, at 571.

⁵³ Stone, *supra* note 40, at 291-294.

⁵⁴ French, *supra* note 16, at 53, 55.

⁵⁵ Even in the environmental arena notions of formal equality have a strong hold. See Protocol to the 1979 Convention on Long-range Transboundary Air Pollution on Long-term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe, September 24, 1984, 1491 U.N.T.S. 167, where a uniform reduction was accepted, even though it was much more burdensome for the former Soviet and Eastern European States.

science and technology that flowed from the process of industrialization.⁵⁶ The principle's different underpinnings – differential contributions to environmental degradation, greater capabilities on the part of the developed countries, and commitment to solidarity and partnership – are all consistent with a broad understanding of what is fair or equitable. Thus, it could be considered unfair if those who have contributed the most to the problem do not contribute more to the solution than those whose contribution is much smaller. Similarly, in the face of a problem demanding a collective solution, it would be unfair to expect those with the least resources to commit a higher share to the solution of the problem.

As the above discussion has revealed, the terms, grounds and justifications put forward for differentiated responsibilities in favor of developing countries emanate from considerations of equity and fairness.⁵⁷ The language of sharing responsibilities for collective problems, of taking account of the relative position and capacities of developing and developed countries in the establishment and implementation of international regimes is the idiom of fairness and equity in relations between states.

The next two sections of this chapter examine how one dimension of common but differentiated responsibilities, namely technology transfer and financial assistance, are implemented in the Convention and Kyoto Protocol.

5.3 Technology transfer

The question of technology transfer relates in a number of ways to the international environmental law and the principle of common but differentiated responsibilities. First, it is clear that in order to manage the global environment, it is critical that developing countries are able to develop in a fashion that is less wasteful, resource intensive, and polluting than the path followed by the industrialized countries. In particular, in the context of climate change, anything like an equalization of per capita greenhouse gas emissions at current developing country levels would be disastrous for the global climate. Second, it would be profoundly unfair and inequitable if the peoples of the developing world were to be permanently consigned to a much lower level of economic activity than the rich. The economies – and the emissions – of developing countries will grow, as is fair and equitable. Sustainable development, by integrating social, economic and environmental concerns, ought to lead to a way out of this conundrum. A differentiated approach to obligations considers the relative capacities of the parties, as well as their contribution to the problem at hand, and guides the assumption of responsibilities for action on this basis. Technology transfer is intended to assist developing countries achieve the national imperatives of growth and poverty eradication, while

⁵⁶ Stone, *supra* note 16, at 300, noting the difficulty holding current generations in industrialized countries responsible for the actions of their forebears, as well as the “ironic argument of adverse possession and prescription”.

⁵⁷ See Philippe Sands, *The “Greening” of International Law: Emerging Principles and Rules*, 1 IND. J. GLOBAL LEG. STUD. 293, 307 (1994), (differentiated responsibility results from the application of the broader principle of equity in general international law, as well as recognition that the special needs of developing countries must be taken into account in international environmental law); See also Matsui, *supra* note 40, at 155, citing Henry Shue, *Global Environment and International Equity*, 75 INTERNATIONAL AFFAIRS 533-540 (1999).

also assuming responsibility for combating global environmental degradation.⁵⁸ Success in combating climate change will require both technological innovation and the rapid and widespread transfer and implementation of environmentally sound technologies (ESTs) for mitigating the effects of greenhouse gas emissions and for adapting to climate change.⁵⁹

5.3.1 Technology transfer in MEAs

Provisions relating to the transfer of environmentally sound technology are a staple of multilateral environmental agreements and other instruments. For instance, technology transfer is referred to in Principle 20 of the Stockholm Declaration, and Principle 9 of the Rio Declaration. Chapter 34 of Agenda 21 also pertains to technology transfer. The commitments are generally cast in terms of a commitment by developed countries to promote, facilitate or finance the transfer of environmentally sound technology to developing countries.⁶⁰ It appears that generally the commitments have not gone beyond the rhetorical to real transfer and uptake of technologies.⁶¹ Technology transfer was an element of the defunct quest to establish a New International Economic Order.⁶² The United Nations Convention on the Law of the Sea of 1982 also contains far-reaching technology transfer provisions, which can be regarded as the high-water mark in this regard.⁶³ Important provisions also are contained in the major MEAs adopted at Rio and afterwards.⁶⁴ The re-emergence of technology transfer in the context of MEAs has been traced to the recognition by developed countries that global environmental problems required a collective response, which could be facilitated by offering technology transfer to developing countries.⁶⁵ With the London and Copenhagen Amendments to the Montreal Protocol, parties were required to take steps to ensure that the “best available, environmentally safe substitutes and related technologies are expeditiously transferred to” (article 10A) developing-country parties and that those transfers occur under fair and most favorable conditions. This was coupled with recourse to

⁵⁸ Colin M. Alberts, *Technology Transfer and Its Role in International Law: A Structural Dilemma*, 6 HARV. J. L. & TECH. 63, 65 (1992).

⁵⁹ IPCC, SPECIAL REPORT, METHODOLOGICAL AND TECHNOLOGICAL ISSUES IN TECHNOLOGY TRANSFER (Bert Metz, et al, eds., 2000).

⁶⁰ Gaetan Verhoosel, *Beyond the Unsustainable Rhetoric Sustainable Development: Transferring Environmentally Sound Technologies*, 11 GEO. INT'L ENVTL. L. REV. 49 (1998).

⁶¹ *Id.* at 49-51.

⁶² On the NIEO, *see supra* note 14.

⁶³ *Supra* note 13. The Law of the Sea Convention provides for technology transfer in the context of the protection and preservation of the marine environment Part XII (articles 202-203) and the development and transfer of marine technology in Part XIV (articles 266-274). The objective of Part XIV is to enable developing countries to share in the exploration and exploitation of marine resources, particularly with respect to deep seabed mining. The Agreement on the Implementation of the Part XI of the Convention modified the scheme with respect to deep seabed mining so that technology transfer is on a commercial, not mandatory basis, and provides for the protection of intellectual property rights. *Supra* note 13. See also D. H. Anderson, *Legal Implications of the Entry into Force of the U. N. Convention on the Law of the Sea*, 44 INT'L COMP. L.Q. 313, 318 (1995).

⁶⁴ See e.g., Convention on Biological Diversity, *supra* note 21, art. 16, UNFCCC, *supra* note 1, art 4(5), and Convention to Combat Desertification and Drought, *supra* note 22, arts. 6(e) and 18

⁶⁵ Verhoosel, *supra* note 60, at 53-54. See also Alberts, *supra* note 58, at 65.

the Multilateral Fund to meet the incremental costs of compliance in adopting substitutes to ozone depleting substances.

The Convention contains a number of provisions relating to technology transfer. Article 4(5) provides that:

“The developed country Parties...shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other parties, particularly developing country Parties, to enable them to implement the provisions of the Convention. In this process, the developed country parties shall support the development and enhancement of endogenous capacities and technologies of developing country parties.”

A few points may be made in relation to this paragraph. First, it does not mandate the transfer of technology, but rather requires parties to take “all practicable” steps and the obligation may consist of facilitating access to EST – not necessarily a very strong or binding duty. Second, the provision applies to transfer from developed to developing countries (“vertical transfer”) as well as transfer between developed countries (“horizontal transfer”). Third, it recognizes the need to build capacity in (recipient) developing countries, since technology transfer is not limited to the installation of hardware, but includes also the “software” or knowledge and skills to employ the technology.⁶⁶

The commitment to technology transfer in article 4(5) of the Convention (echoed in article 10(c) of the Protocol) is cast in general terms and lacks procedures for its implementation. It is therefore not surprising that the Conference of the Parties (COP) to the Convention has taken a series of decisions on technology transfer.⁶⁷ For instance, the COP has tasked the Subsidiary Body for Scientific and Technological Advice (SBSTA) with carrying out a “consultative process” on technology transfer with the aim of making recommendations to enhance the implementation of article 4(5).⁶⁸ At the request of the COP the Secretariat of the Convention has carried out a number of activities to promote technology transfer, including the compilation and synthesis of information on financial resources and technology transfer activities and the development of a web-based technology information system (TT:CLEAR).⁶⁹ At Marrakesh the COP also adopted a “framework for meaningful and effective actions to enhance the implementation of article 4(5)” and requested the GEF to provide funding to implement the

⁶⁶ See *Capacity-building in the Development and Transfer of Technologies*, UNFCCC Technical Paper, para. 10, U.N. Doc. FCCC/TP/2003/1 (2003). See also E7 TECHNOLOGY DIFFUSION WORKING GROUP, RENEWABLE ENERGY DIFFUSION: FINAL REPORT, para. 2.4 (2003), available at http://www.e7.org/PDFs/e7_Renewable_Energy_Technology_Diffusion_Final_Report.pdf.

⁶⁷ See e.g. decision 11/CP.1, in *Report of the Conference of the Parties on its First Session*, Addendum, Part II: Action taken by the Conference of the Parties, FCCC/CP/1995/7/Add.1 (1995).

⁶⁸ Decision 4/CP.4, in *Report of the Conference of the Parties on its Fourth Session*, Addendum, Part II: Action taken by the Conference of the Parties, FCCC/CP/1998/16/Add.1 (1999).

⁶⁹ Website of the UNFCCC Secretariat, http://unfccc.int/cooperation_and_support/technology/items/3031.php.

framework.⁷⁰ The COP also decided to establish an expert group on technology transfer to analyze and report on means to facilitate technology transfer.⁷¹

5.3.2 Technology transfer in action

Technology transfer is best understood as a broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector entities, financial institutions, non-governmental organizations (NGOs) and research/education institutions.⁷² The terms diffusion of technologies and technology cooperation are also sometimes used synonymously with transfer, and connote a “pull” model that is closer to reality than the “push” element associated with transfer as a concept.⁷³ Importantly, the definition should extend to understanding, utilizing and even replicating the technology, including adapting it to local conditions and integrating it with indigenous technologies.⁷⁴

Practically, technology transfer encompasses all of the following: direct purchases, licensing, franchising, foreign direct investment, sale of turn-key plants, joint ventures, sub-contracting, cooperative research arrangements, exchange of scientific and technical personnel, science and technology conferences/trade shows/exhibits, open literature, information exchange mechanisms, and official development assistance (ODA).⁷⁵ Successful technology transfer is generally viewed as requiring a number of steps, including agreement and establishment of partnerships between stakeholders; technology transfer needs assessment; implementation of technology transfer, including policy measures and capacity building to remove barriers; evaluation and refinement; and replication.⁷⁶

The debate over technology transfer has tended to be entangled in the opposing views of developed countries, which view it as a private sector matter, and developing countries which regard it as a matter of concessional government-to-government exchange.⁷⁷ There recently been a shift toward a position that recognizes that the greatest potential for technology transfer resides with multinational corporations (MNCs), resulting in more focus on how to create an “enabling

⁷⁰ Decision 4/CP.7, in *Report of the Conference of the Parties on its Seventh Session, Addendum, Part II: Action taken by the Conference of the Parties, vol. I, FCCC/CP/2001/13/Add.1*.

⁷¹ *Id.*

⁷² IPCC, *supra* note 59.

⁷³ Industry and the private sector are certainly more comfortable with a more decentralized, voluntary and market-based understanding of diffusion. *See supra* note 66.

⁷⁴ IPCC, *supra* note 59, at 1.

⁷⁵ The UNFCCC Secretariat has established a web-based technology clearing house with the aim of improving the flow of, access to and quality of the information relating to the development and transfer of environmentally sound technologies. The site is available at <http://ttclear.unfccc.int/ttclear/jsp/>.

⁷⁶ CLIMATE TECHNOLOGY INITIATIVE, METHODS FOR CLIMATE CHANGE TECHNOLOGY NEEDS ASSESSMENTS AND IMPLEMENTING ACTIVITIES: DEVELOPING AND TRANSITION COUNTRY APPROACHES AND EXPERIENCES 4 (2002) available at http://ttclear.unfccc.int/ttclear/pdf/TNA/CTI/Tech%20Transfer%20Guidelines-12%20final_.pdf; *Technical Paper on Terms of Technology Transfer and Know-how: Barrier and Opportunities related to the Transfer of Technology*, FCCC/TP/1998/1 5 (1998).

⁷⁷ Verhoosel, *supra* note 60, at 66.

environment” for transfer by the private sector.⁷⁸ Much, if not most environmentally sound technology is owned by the private sector, which is also a major innovator, responsible for some 80 per cent of research and development spending⁷⁹; in the eyes of developing countries intellectual property rights presents a barrier to technology transfer. In this respect, trade rules also have important implications for technology transfer. The Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPS) sets out the standards of protection for a comprehensive list of intellectual property rights, including patents and industrial designs. The TRIPS Agreement also includes several provisions on technology transfer, including an obligation on developed countries’ governments to provide incentives for their companies to transfer technology to least-developed countries (Article 66.2). Due to unhappiness on the part of least-developed countries with the implementation of this provision, it was agreed that a mechanism would be put on place to ensuring the monitoring and implementation of the obligation.⁸⁰

Foreign direct investment (FDI) can serve to diffuse and transfer technology, as it not only introduces technologically advanced capital goods, but also “technology spillover” to national firms through the turnover of skilled personnel, imitation, and more rigorous standards for local suppliers.⁸¹ However, a recent WTO study that concluded that of the impact of trade on technology transfer is mixed, with some goods (machinery and equipment) associated with greater diffusions of technology.⁸² With fears that older, dirty technology could be “dumped” in developing countries, it is worth examining the effect of FDI on the environment. The analysis of the relationship between FDI and the environment breaks down into a number of strands, one focusing on the effect of competition for FDI (the “pollution haven” thesis) and the other investigating the effect on the environment of increased FDI flows.⁸³ A recent review of the literature suggests that no general conclusion can be drawn concerning the effect of FDI on the environment – the answer is context dependent.⁸⁴ A well-supported conclusion is that host country environmental policies are important in improving the

⁷⁸ *Id.* at 66. See also *Commission on Sustainable Development, Report of the Sixth Session*, E/CN.17/1998/20, Chapter I, Decision 6/3, repeating the repeating the stalemate language of “access to and transfer of environmentally sound technologies...on favourable terms,including on concessional and preferential terms, as mutually agreed, taking into account the need to protect intellectual property rights...” at para. 2(g), but also that “Governments should try to facilitate the transfer of environmentally sound technologies by creating a policy environment that is conducive to technology-related private sector investments and long-term sustainable development objectives...”, para. 2(e)(i).

⁷⁹ U.N. CONF. ON TRADE & DEV., INVESTMENT AND TECHNOLOGY POLICIES FOR COMPETITIVENESS: REVIEW OF SUCCESSFUL COUNTRY EXPERIENCES at 10, UNCTAD/ITE/IPC/2003/2 (2003).

⁸⁰ *Implementation-related Issues and Concerns*, Ministerial Decision, WT/MIN(01)/17, para. 12.2, November 14, 2001.

⁸¹ WTO SECRETARIAT, TRADE AND TRANSFER OF TECHNOLOGY, WT/WGTTT/W/1, at 16 (Background note by the Secretariat) (2002); OECD, WORKING PARTY ON GLOBAL AND STRUCTURAL POLICIES, ENVIRONMENTAL BENEFITS OF FOREIGN DIRECT INVESTMENT: A LITERATURE REVIEW, ENV/EPOC/GSP(2001)10/FINAL (2002).

⁸² WTO Secretariat, *supra* note 81, at 13-14.

⁸³ OECD, *supra* note 81, at 6.

⁸⁴ *Id.* at 7.

environmental performance of FDI.⁸⁵ In addition to the enforcement of national environmental standards, the spread of good practice at the firm level by MNCs may also lead to improved environmental performance at local affiliates, based on home country practices.⁸⁶

At present there appears to be a dearth of detailed data on the scale of technology transfer in relation to technologies relevant to ESTs in general, and climate change in particular.⁸⁷ The extent of investment in climate relevant sectors and technology is poorly documented.⁸⁸ Nonetheless, idea of the volume and trends can be gleaned from the financing provided by the World Bank, GEF and export credit agencies.

5.3.2.1 International institutions and donors

The activities of the World Bank Group (WBG)⁸⁹ have been criticized for its support of extractive and greenhouse gas intensive industries, including loans for the development of oil and gas reserves. Although the total volumes of Bank commitments for oil and gas are relatively low, for instance totaling about US\$ 480 million in 2003, Bank investment often serves as a pre-condition for the participation of private sector lenders, with the result that Bank approval can be decisive for a project's financial viability. The *Extractive Industries Review* - a multi-stakeholder, Bank-initiated review of the on the World Bank Group's activities in the mining, oil and gas sectors – issued a wide-ranging series of recommendations to improve the Bank's performance with respect to sustainable development and human rights criteria.⁹⁰ Noting that the renewable energy made up only 6 per cent of the energy portfolio, the *Review* recommended that the WBG should phase out investments in oil production by 2008 and devote its resources to investments in renewable energy resource development, clean energy technology, and energy efficiency projects.⁹¹

⁸⁵ JANE ELLIS ET AL, TAKING STOCK OF PROGRESS UNDER THE CLEAN DEVELOPMENT MECHANISM (CDM), OECD, COM/ENV/EPOC/IEA/SLT(2004)4/FINAL, 17 (2004).

⁸⁶ See MANAGING THE ENVIRONMENT ACROSS BORDERS: A STUDY OF TNC AFFILIATES' ENVIRONMENTAL PRACTICES IN CHINA, MALAYSIA AND INDIA (Michael W. Hansen, ed., 2002). Key findings are summarized in U.N. CONF. TRADE & DEV., MANAGING THE ENVIRONMENT ACROSS BORDERS, UNCTAD/ITE/IPC/MISC.12 (

⁸⁷ *Supra* note 59. The IPCC's study provides aggregate data for technology transfer by source, but not climate-specific data.

⁸⁸ *Trends of Financial Flows and Terms and Conditions Employed by the Multilateral Lending Institutions*, FCCC/TP/1997/1, 10 (1997).

⁸⁹ Consisting of the International Development Association (IDA), the International Bank for Reconstruction and Development (IBRD), the International Finance Corporation (IFC) and the Multilateral Investment Guarantee Association (MIGA).

⁹⁰ See EXTRACTIVE INDUSTRIES REVIEW, STRIKING A BETTER BALANCE – THE WORLD BANK GROUP AND EXTRACTIVE INDUSTRIES: STRIKING A BETTER BALANCE, Vol. 1, (2004), available at <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTOGMC/0,,contentMDK:20306686~menuPK:592071~pagePK:148956~piPK:216618~theSitePK:336930,00.html>. The official response from the World Bank, WORLD BANK MANAGEMENT RESPONSE TO THE EXTRACTIVE INDUSTRIES REVIEW, 17 September 2004, is available at <http://siteresources.worldbank.org/INTOGMC/Resources/finaeirmanagementresponse.pdf>. The response suggests that the WBG agrees with a number of the recommendations. However, the WBG vowed to remain engaged in oil and coal, while agreeing to increase investment in “new” renewable (including hydro 10MW or smaller) energy by 20 per cent for 5 years.

⁹¹ EXTRACTIVE INDUSTRIES REVIEW, *supra* note 90 at 65-66.

Although the Bank declined to implement the recommendation of the Review to phase out investment in the hydrocarbons sector, it pledged in 2004 to increase its commitments for energy efficiency and new renewable energy – defined as biomass, solar, wind, geothermal and hydro with a capacity of less than 10MW - by 20 per cent per year between 2005 and 2009.⁹² However, the baseline is quite low. During the period 1990-2005, total WBG commitments in the energy sector totaled \$56 billion, of which US\$ 2.5 billion were for new renewables, US\$ \$4.3 billion for large hydropower and US\$2.2 billion for energy efficiency.⁹³ In other words, commitments for new renewables, that is excluding large hydropower, constituted about 4.5 per cent of energy sector commitments. Largely due to substantially increased commitments for energy efficiency, which rose from US\$ 67 million in 2004 to US\$ 447 in 2006, the WBG has met its 20 per cent target. Over the same period support for new renewables remained relatively stagnant, increasing from US\$ 192 to US\$ 221.⁹⁴

With respect to bilateral ODA targeting climate change-related activities, a survey of OECD countries put the amount committed at US\$ 8.1 billion for the period 1998-2000, or 7.2 per cent of total bilateral ODA.⁹⁵ Any discussion of international technology transfer would be incomplete without mention of the Global Environment Facility (GEF). Since its inception in 1991 until 2004, the GEF allocated US\$ 1.74 billion to climate change projects and enabling activities, which leveraged an additional US\$ 9.29 billion in co-financing from the World Bank, regional development banks, and bilateral funds.⁹⁶ (A recent World Bank report gives an idea of the financing challenge – it estimated the cost of mitigating emissions in a range from less than US\$ 10 billion to US\$ 200 billion per year, depending on the stringency of the stabilization target and assumptions.⁹⁷) Some 53 per cent has been allocated to renewable energy and 27 per cent to energy efficiency projects.⁹⁸ The GEF climate change portfolio is organized into four areas: removing barriers to energy efficiency and energy conservation; promoting the adoption of renewable

⁹² See WORLD BANK, *supra* note 90.

⁹³ WORLD BANK, CLEAN ENERGY AND DEVELOPMENT: TOWARDS AND INVESTMENT FRAMEWORK, 110-111 (2006), available at [http://siteresources.worldbank.org/DEVCOMMINT/Documentation/20890696/DC2006-0002\(E\)-CleanEnergy.pdf](http://siteresources.worldbank.org/DEVCOMMINT/Documentation/20890696/DC2006-0002(E)-CleanEnergy.pdf).

⁹⁴ WORLD BANK, IMPROVING LIVES: WORLD BANK GROUP PROGRESS ON RENEWABLE ENERGY AND ENERGY EFFICIENCY IN FISCAL YEAR 2006, Annex 2, table 1 (2006), available at http://siteresources.worldbank.org/EXTENERGY/Resources/336805-1157034157861/Improving_Lives_Low_Res.pdf?.

⁹⁵ OECD, AID TARGETING THE OBJECTIVES OF THE RIO CONVENTIONS: A CONTRIBUTION BY THE DAC SECRETARIAT FOR THE INFORMATION OF PARTICIPANTS AT THE WORLD SUMMIT FOR SUSTAINABLE DEVELOPMENT IN JOHANNESBURG IN AUGUST 2002 (2002). The Development Cooperation Directorate (DAC) is a coordinating mechanism of the 23 OECD country donor agencies; twenty out of the 23 countries provided data for the survey. An earlier, pilot report pegged the figure for 1998 at US\$ 1.8 billion, *see* OECD, AID TARGETING THE RIO CONVENTIONS: FIRST RESULTS OF A PILOT STUDY, A CONTRIBUTION BY THE DAC SECRETARIAT FOR THE INFORMATION OF PARTICIPANTS AT THE SESSION OF THE SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE (SBSTA), (2000).

⁹⁶ See GEF website at http://thegef.org/Projects/Focal_Areas/focal_areas.html#cc

⁹⁷ WORLD BANK, CLEAN ENERGY AND DEVELOPMENT, *supra* note 93.

⁹⁸ GLOBAL ENVIRONMENT FACILITY, 2003 ANNUAL REPORT 13 (2003).

energy by removing barriers and reducing implementation costs; reducing the long-term costs of low greenhouse gas emitting energy technologies; and supporting the development of sustainable transport. Given the limited funds at its disposal, the GEF approach to climate change is in large part devoted to technology diffusion – removing barriers to the adoption of energy efficiency and renewable energy technology, reducing implementation costs for renewable energy, and reducing long-term technology costs by accelerating technological development and increasing the market share of low-greenhouse-gas-emitting technologies.⁹⁹

The export credit agencies of the OECD countries have on average provided around US\$ 90 billion in loans, credit guarantees and investment insurance per year to developing countries.¹⁰⁰ For instance, from 2000-2004 the percentage exposure (loan guarantees and loans) of the US Ex-Im bank has been around 10-14 per cent for power projects – largely made up of gas turbine equipment, with no wind, solar or other non-hydro renewables listed – and 10 per cent for oil and gas from 2000 to 2004.¹⁰¹

5.3.2.2 Clean Development Mechanism

The Clean Development Mechanism (CDM) has been hailed as an innovative instrument to bring private capital into the technology transfer process.¹⁰² As stated in article 12(2) of the Kyoto Protocol, the twin purposes of the CDM are to “to assist Parties not included in Annex I in achieving sustainable development”, as well as to assist Annex 1 parties in achieving their emission limitation and reduction commitments. Technology transfer is a necessary ingredient for sustainable development, especially for developing countries where the accent is frequently on industrialization. With respect to the determination of what constitutes sustainable development, the Marrakech Accords provide that “it is the host Party's prerogative to confirm whether a Clean Development Mechanism project activity assists it in achieving sustainable development”.¹⁰³ It is also possible that host countries could consider transfer of technology as a one criterion. Some countries have identified

⁹⁹ ERIC MARTINOT & OMAR MCDOOM, GLOBAL ENVIRONMENT FACILITY, PROMOTING ENERGY EFFICIENCY AND RENEWABLE ENERGY: GEF CLIMATE CHANGE PROJECTS AND IMPACTS 5-6 (2000). Martinot and McDoom, at 35, conclude that: “Overall, prospects for sustainability and replication of GEF climate change projects are still mixed and uncertain.” Nonetheless, there are some undoubted success stories of technology diffusion, for instance the more energy efficient refrigerator project (get reference).

¹⁰⁰ CÉDRIC PHILIBERT, OECD ENVIRONMENT DIRECTORATE/INTERNATIONAL ENERGY AGENCY, INTERNATIONAL ENERGY TECHNOLOGY COLLABORATION AND CLIMATE CHANGE MITIGATION, COM/ENV/EPOC/IEA/SLT(2004)1, 16 (2004).

¹⁰¹ EXPORT-IMPORT BANK, 2004 FINANCIAL REPORT (2004). The financial reports for the years 2000-2004 provide a breakdown of items covered by country, and show no listing for renewable energy, excluding hydro, which may have been reported under headings for generators. In its 2000 Financial Report the Bank stated that its environmental portfolio amounted to over US\$2 billion, out of total of over US\$61 billion. Similar breakdown is not presented in subsequent reports. Reports are available at <http://www.exim.gov>.

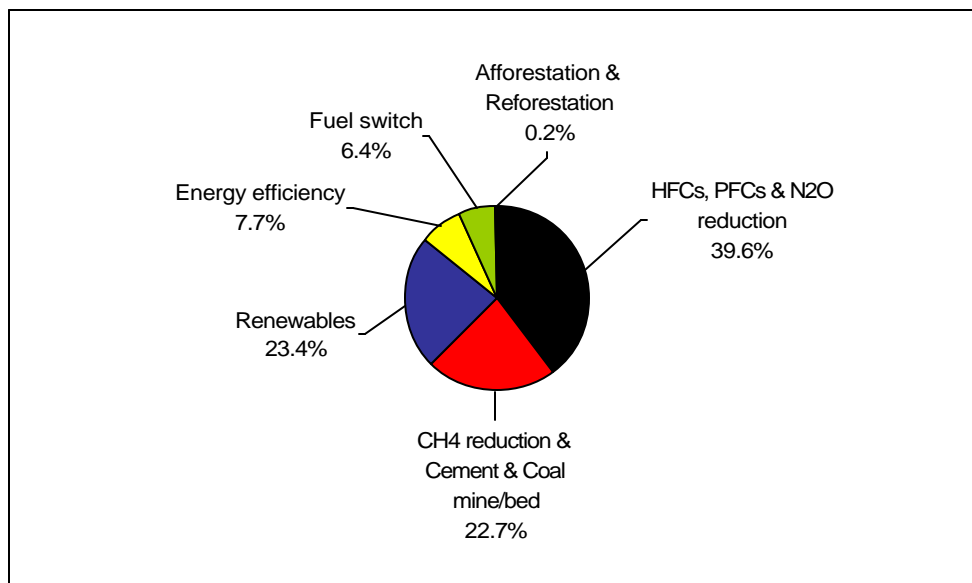
¹⁰² Verhoosel, *supra* note 60, at 70.

¹⁰³ Decision 16/CP/7, in *Report of the Conference of the Parties on its Seventh Session, Addendum, Part II: Action taken by the Conference of the Parties*, vol. II, FCCC/CP/2001/13/Add.2 (2002).

preferred areas for CDM projects in an attempt to promote investment in projects with multiple benefits.¹⁰⁴

A review of progress under the CDM found that funds available by 2004 amounted to US \$800m, rising to an estimated US \$1 billion per year in the coming years.¹⁰⁵ And since CDM finance makes up an estimated one-sixth to one-eighth of total project cost, the amount of investment stimulated by CDM could be between 6-8 billion, which compares favorably with the GEF's contribution.¹⁰⁶ While the market for certified emission reductions (CERs) from CDM projects may indeed confound pessimists' predictions, visions of a bonanza of clean energy projects have not materialized. There are a number of reasons for this. First, transaction costs for many renewable energy projects, such as solar photovoltaics, are so high that they render them unviable as commercial investments; nonetheless, donors or NGOs such as conservation groups may execute a proportion of such projects under the CDM.

CDM Portfolio – Projected share of total CERs in 2012 by project type



Source: CDM Pipeline, Jørgen Fenhann, UNEP Risø Centre

Second, projects proving most profitable – such as methane capture from landfills or the destruction of HFC-23, an industrial waste gas – are outside the

¹⁰⁴ For example the rules applicable to CDM projects provide that “priority areas for CDM projects in China are energy efficiency improvement, development and utilization of new and renewable energy, and methane recovery and utilization”. See art. 4, Measures for the Operation and Management of Clean Development Mechanism Projects in China, NRDC, 21 November 2005, available at <http://cdm.ccchina.gov.cn/english/main.asp?ColumnId=27>. More concretely, the rules also provide for very different government shares of the proceeds of the credits– taxation – for different types of project. Thus, according to art. 24 of the rules the government share from HFC and PFC projects is 65 per cent, while for projects falling into the preferred category it is only 2 per cent.

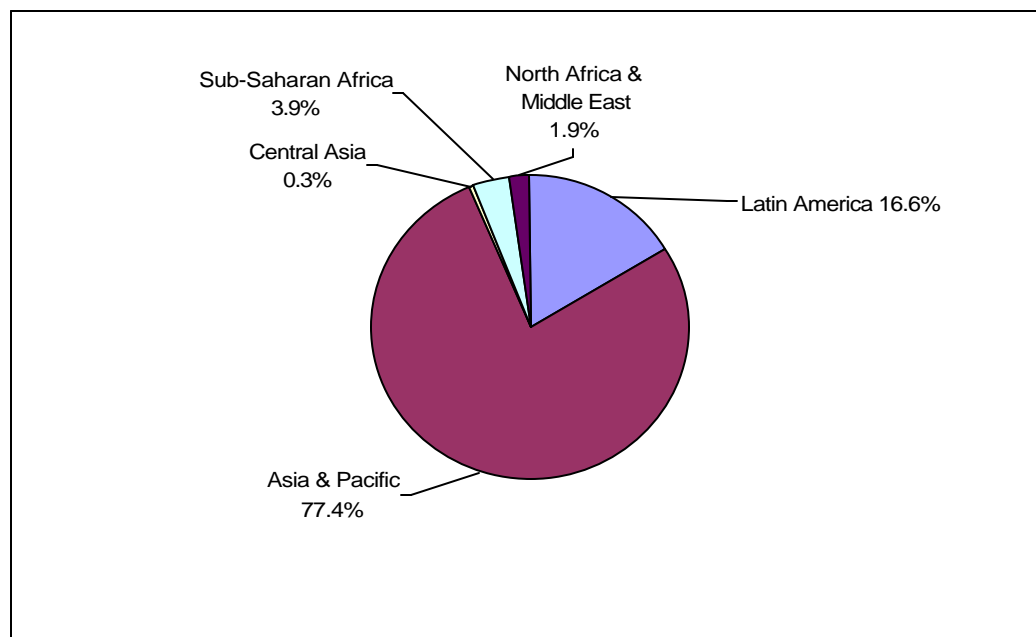
¹⁰⁵ Ellis et al, *supra* note 85, at 18.

¹⁰⁶ *Id.* at 18.

energy sector and do not offer significant benefits in terms of technology transfer.¹⁰⁷ HFC-23 is a waste gas created in the production of HCFC-22, a gas used in air-conditioners and itself a potent ozone-depleting substance. This has given rise to a perverse incentive – a CDM project at a new HCFC plant offers potentially hundreds of millions of dollars in credits, but at the same time works at cross purposes with the effort to cut down on substances that deplete the ozone layer.¹⁰⁸

A detailed analysis by United Nations Development Programme (UNDP) reveals that the geographic distribution of CDM projects is very uneven, with Asia and Latin America accounting for the lion's share (96 percent of projects).¹⁰⁹ Together they are expected to generate around 95 percent of CERs flow through 2012; Africa is expected to garner only around 3 per cent of CERs by that date. Moreover, the report notes that while some 80 per cent of projects employ technologies that have the potential to promote sustainable development in the host country, for instance energy efficiency, a total of 21 projects abating emissions of industrial gases are expected to be responsible for almost half of all CERs through 2012.

Projected regional distribution of CERs in 2012



Source: Adapted from CDM Pipeline, Jørgen Fenhann, UNEP Risøe Centre

¹⁰⁷ These projects are profitable due to the very high greenhouse warming potential (GWP) of the gases involved, yielding very high carbon equivalent reductions for very low cost. For more details on GWP see chapter 1. N₂O-reduction projects, related to adipic acid production, are also beginning to attract attention on the grounds of the high GWP of N₂O and low costs. With the introduction of control technologies, nitrous oxide emissions from adipic acid production have fallen significantly in developed countries. See IPCC, CLIMATE CHANGE 2001: MITIGATION, CONTRIBUTION OF WG III TO THE THIRD ASSESSMENT REPORT 213 (Ogunlade Davidson & Bert Metz, eds., 2001).

¹⁰⁸ The situation is made worse in that substitutes for HCFC, which is used in home air-conditioners, are not cheap. This comes at a time when sales of air-conditioners are soaring in China and other developing countries. See Keith Bradsher, *Moving Faster on Refrigerants*, NY TIMES, March 15, 2007.

¹⁰⁹ UNDP, THE CLEAN DEVELOPMENT MECHANISM: AN ASSESSMENT OF PROGRESS, 11-12 (2006).

The impact of transaction costs, which are partially a function of the complicated approval process, is largely determined by the size of the project.¹¹⁰ For large projects, which generate many CERs, the ratio of transaction costs to total costs will be small, and will thus not be a major determinant of project feasibility. However, for small, community-scale projects that may yield local sustainable development benefits, transaction costs constitute a more important barrier. Among the solutions to accommodate small-scale projects within the CDM framework are simplified rules, as well as “bundling” of smaller projects, which consists of aggregating several activities under one CDM project.¹¹¹ Bundling is also permissible for large-scale projects, and “project activities under a programme of activities can be registered” as a single project.¹¹² However, national or regional policies or standards do not qualify as a CDM projects.¹¹³ So for instance the adoption of air conditioner efficiency standard in developing country does not fall within the CDM.

Every CDM project must be based on a project-specific baseline methodology approved by the Executive Board. A baseline is needed because the certified emissions reductions (CERs) generated by a project are calculated by comparing the emissions of the CDM project with the emissions under a business as usual scenario.¹¹⁴ In other words, for a wind farm project that feeds electricity to the grid, the emissions intensity of power supplied from the grid is the baseline against which credits for the project are calculated. Methodologies are quite specific, for example “landfill gas capture and electricity generation projects where landfill gas capture is not mandated by law”.¹¹⁵ A project developer wishing to establish a project under slightly different circumstances would need to draw up a new methodology, and submit it for approval to the Executive Board. This entails added expense, yet because once approved methodologies are publicly available, others can use them but without sharing in the cost of their development, which may act as a disincentive. Sequestration projects – afforestation and reforestation are permitted under the CDM - are among the limited opportunities available in Least Developed Countries (LDCs), which lack the industrial infrastructure for emission mitigation projects. Although such projects may yield a range of benefits, direct technology transfer is not among them.

¹¹⁰ AXEL MICHAELOWA & MARCUS STRONZIK, TRANSACTION COSTS OF THE KYOTO MECHANISMS 175 (Hamburg Institute of International Economics, Discussion Paper, 2002).

¹¹¹ See decision 17/CP.7, *supra* note 103 and decision 21/CP.8, in *Report of the Conference of the Parties on its Eighth Session, Addendum, Part II: Action taken by the parties*, vol. III, FCCC/CP/2002/7/Add.3.

¹¹² Decision 7/CMP.1, in *Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its first session, Addendum, Part II: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol*, paras. 20-21, FCCC/KP/CMP/2005/8/Add.1. For an examination of what could fall under the “programmatic CDM”, see JANE ELLIS, OECD, ISSUES RELATING TO IMPLEMENTING “PROGRAMMATIC CDM”, available at <http://www.oecd.org/dataoecd/42/31/36278652.pdf>.

¹¹³ Decision 7/CMP.1, *supra* note 112, at para. 20.

¹¹⁴ Axel Michaelowa, *Determination of baselines and additionality for the CDM: a crucial element of the credibility of the climate regime*, in CLIMATE CHANGE AND CARBON MARKETS: A HANDBOOK OF EMISSIONS REDUCTIONS MECHANISMS 287, 290-292 (Farhana Yamin, ed., 2005).

¹¹⁵ See “Approved Baseline Methodology AM0010”, available at http://cdm.unfccc.int/UserManagement/FileStorage/CDMWf_AM_675903718.

The methodology applied to determine CDM eligibility narrowly circumscribes projects that can claim emissions credits, or certified emission reductions (CERs), as they are known. While the methodological rigor – project developers would say rigidity – reduces the number of projects that can claim CDM status, the it arguably improves the likelihood that projects that are approved will promote technology transfer. A strict methodology is necessary to safeguard the environmental integrity of the Protocol and so that the CDM does not become a backdoor for Annex 1 parties to circumvent their emissions “caps”. The Protocol therefore provides that a CDM project must result in GHG reductions that are “additional to any that would occur in the absence of the certified project activity”.¹¹⁶ The interpretation of this requirement has given rise to some uncertainty,¹¹⁷ but the responsible subsidiary organ has recently issued a step-by-step guideline that makes clear that a rigorous approach to additionality will be applied.¹¹⁸ Pursuant to demonstrating additionality, a significant number of CDM project submitted for approval have referred to low penetration rates, or barriers to deployment, of the technology in question.¹¹⁹ Thus if a developer can show that the proposed technology has not previously been deployed in a similar market in similar circumstances, this can help the project clear the “additionality” hurdle.

The methodology employed for the calculation of the baseline for CDM projects potentially also influences the potential for technology transfer. A baseline scenario, essentially business as usual, must be established so that the emission reduction potential of the project can be determined. This basically involves a counterfactual analysis to establish the situation that would have obtained in the absence of the project activity, for example if, instead of electricity from solar panels, grid electricity – generated from fossil fuels – had been provided. Establishing the appropriate baseline is important – if it assumes little or no technological advance, in other words is set too low, the project developer will reap an unjustified advantage. If the baseline standard is too stringent – mandating “best available technology” when the prevailing standard is less-advanced technology – this would hinder rather

¹¹⁶ See Kyoto Protocol, *supra* note 19, art. 12(5)(c). See also decision 17/CP.7, *Report of the Conference of the Parties on its Seventh Session*, Addendum, Part II: Action taken by the Conference of the Parties, vol. II, annex, para. 43, FCCC/CP/2001/13/Add.2, which provides that “[a] CDM project activity is additional if the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the...CDM project activity.”

¹¹⁷ Under the stricter standard recommended by the Methodology Panel, the additionality assessment must show that the proposed CDM project would not have occurred in the absence of the CDM. See *Report of the Sixth Meeting of the Methodologies Panel*, 7-8 July, available at http://cdm.unfccc.int/Panels/meth/Report_06_rev.pdf. For a discussion of additionality and the work of the subsidiary organs Protocol, see JANE ELLIS, OECD, EVALUATING EXPERIENCE WITH ELECTRICITY-GENERATING GHG MITIGATION PROJECTS, COM/ENV/EPOC/IEA/SLT(2003)8, 12-16 (2003). For critical view of the approach to additionality, see Editor’s Note, *CDM: Birth or Abortion*, in 9(2) JOINT IMPLEMENTATION QUARTERLY (JIQ), July 2003, available at <http://jiq.wiwo.nl/2-2003.pdf>.

¹¹⁸ *Report of the Sixteenth Meeting of the CDM Executive Board*, Annex 1, 21-22 October 2004, available at <http://cdm.unfccc.int/EB/Meetings>. One of the steps that may be used in demonstrating additionality is a barrier analysis, including whether the proposed project faces technological barriers or is a “first of its kind” in the host country.

¹¹⁹ See ELLIS, EVALUATING EXPERIENCE WITH ELECTRICITY-GENERATING GHG MITIGATION PROJECTS, *supra* note 117, at 18-19, setting out projects and additionality assessments.

than promote the transfer of cleaner technology to developing countries.¹²⁰ The three alternative approaches prescribed for establishing a baseline methodology are strict but not overly stringent.¹²¹ (As it is, criticism has been directed not at the baselines, but rather at the question of additionality.) Technology considerations are thus a central element in structure of the CDM.

CDM investment holds considerable potential with respect the transfer of low- and no GHG-emitting technology, particularly to the extent that it can stimulate or augment private sector inflows.¹²² The analysis of the methodological aspects of the CDM has shown how technology considerations are central to its implementation. However, the very rigor of the methodologies has served to constrain – if for good reason – the application of the CDM. Being predicated on efficiency, it has also meant that investors have sought out those projects offering the highest volume of CERs at the lowest cost, but not necessarily providing broader sustainable development benefits. If these projects capture the market, the twin promise of the CDM – GHG mitigation at low cost and the sustainable development in the host countries – will have been only partially fulfilled. This has implications for questions of equity. In addition, the private sector orientation of the CDM has also meant that investment has flowed to those countries that are already beneficiaries of FDI and have in place the required “enabling environment”. For instance, in 2004 Africa accounted for only 5 per cent of expected credits,¹²³ figure that is not set to change the end of the Kyoto first commitment period in 2012. The CDM is, of course, concerned with mitigation, but it points to broader concern – the focus on mitigation technology, at the expense of adaptation technology. This also raises equity questions because the adaptive capacity of developing countries is generally much weaker than that of developed countries, yet they are projected to bear the brunt of climate change impacts. There exists a need to better understand adaptation technology and to promote transfer and access to it.

5.4 Sharing the burden – the GEF and the climate change funds

This section examines the assistance provided to developing countries by the Global Environment Facility (GEF) and the climate change funds established under the Convention and the Kyoto Protocol, namely the special climate change fund, the Least Developed Countries Fund and the Adaptation Fund.

¹²⁰ Michael A. Toman, *Establishing and Operating the Clean Development Mechanism*, in CLIMATE CHANGE ECONOMICS AND POLICY: AN RFF ANTHOLOGY, 216, 220 (Michael A. Toman, ed., 2001).

¹²¹ Decision 17/CP.7, *supra* note 116, annex, para. 48(c): “The average emissions of similar project activities undertaken in the previous five years, in social, economic, environmental and technological circumstances, and whose performance is among the top 20 per cent of their category.” See also elaboration in *Report of the Eighth Meeting of the CDM Executive Board*, Annex 1 (clarifications on issues relating to baseline and monitoring methodologies), 19-20 March 2003, available at <http://cdm.unfccc.int/EB/Meetings/008/repan1.pdf>. Further guidance is provided in *Report of the Tenth Meeting of the CDM Executive Board*, Annex 1, (Further clarification on methodological issues), available at <http://cdm.unfccc.int/EB/Meetings/010/eb10repan1.pdf>.

¹²² ELLIS ET AL, *supra* note 85 at 7.

¹²³ *Id.*

5.4.1 The Global Environment Facility

The GEF stands out as a unique experiment in the international environmental arena, not only as the only source of funding dedicated to global environmental problems, but also in its governance structure.¹²⁴ It supports projects to achieve agreed global environmental benefits in the field of climate change, biodiversity, international waters, protection of ozone layer, land degradation, and persistent organic pollutants.¹²⁵ Since its inception in 1991, the GEF has made US \$4.5 billion in grants and generated US \$14.5 billion in co-financing for projects in developing countries and countries with economies in transition.¹²⁶ The GEF stands as a hybrid – combining in its structure and decision-making procedures elements typical of United Nations entities with those associated with the Bretton Woods institutions. Its serves to secure “global public goods” by seeking to protect those features of the planet in which there is a collective interest.¹²⁷ It also forms a key link in the “bargain” between developed and developing countries relating to the combating of global environmental problems. Thus one chronicler of the GEF has stated that:¹²⁸

“The main purpose of the GEF from a developing country perspective is to provide the financial means to incorporate measures for the global environment as part of other plans and activities. It enables developing countries to go beyond being part of rule-making at the international level, to become active participants in multilateral efforts to protect the global environment. And in those global

¹²⁴ A good overview of the establishment and key institutional features of the GEF can be found in LAURENCE BOISSON DE CHAZOURNES, *THE GLOBAL ENVIRONMENT FACILITY AS A PIONEERING INSTITUTION: LESSONS LEARNED AND LOOKING AHEAD* (GEF Working Paper 19, October 2003). Rich and comprehensive accounts of establishment and restructuring of the GEF are contained in two working papers prepared by HELEN SJÖBERG *RESTRUCTURING THE GEF* (Working Paper 13, September 1999) [Hereinafter SJÖBERG, *RESTRUCTURING*] and *FROM IDEA TO REALITY: THE CREATION OF THE GLOBAL ENVIRONMENT FACILITY* (Working Paper 10, October 1994) [Hereinafter SJÖBERG, *CREATION*], both of which are available on the GEF website. See also Jacob Werksman, *Consolidating Governance of the Global Commons: Insights from the Global Environment Facility*, 6 YRBK. INT. ENV. L. 27-63 (1995); Alan S. Miller, *The Global Environment Facility and the Search for Financial Strategies to Foster Sustainable Development*, 24 VT. L. REV. 1229 (2000); and Andrew Jordan, *Paying the Incremental Costs of Global Environmental Protection: The Evolving Role of GEF*, ENVIRONMENT, Jul. 1994, at 12.

¹²⁵ *Instrument for the Establishment of the Restructured Global Environment Facility*, as amended by the Second GEF Assembly, Beijing 2002, art. 1(2) available at http://thegef.org/GEF_Instrument3.pdf.

¹²⁶ http://www.gefweb.org/What_is_the_GEF/what_is_the_gef.html. In the pilot phase the thematic areas were confined four – climate change, biodiversity, international waters, and ozone depletion. Calls to include desertification were resisted by the developed countries, which feared that this would introduce a broader agenda, to the detriment of the four thematic areas. See SJÖBERG, *RESTRUCTURING*, *supra* note 124, at 19-20. The compromise solution, reflected in the 1994 restructuring, provided that the GEF would cover “The agreed incremental costs of activities concerning land degradation, primarily desertification and deforestation, as they relate to the four focal areas shall be eligible for funding.” Amendments adopted by the Second GEF Assembly in 2002 extended land degradation and persistent organic pollutants. See Second Assembly of the GEF, Beijing, China, 16-18 October 2002, *Proposed Amendments to the Instrument*, GEF/A.2/9, available at http://www.thegef.org/participants/Assembly/2nd_Assembly/2nd_assembly.html. See also Stockholm Convention on Persistent Organic Pollutants, May 22, 2001, art. 13(6), concerning the financial mechanism for the Convention.

¹²⁷ BOISSON DE CHAZOURNES, *supra* note 124, at 1; SJÖBERG, *RESTRUCTURING*, *supra* note 124, at 52.

¹²⁸ SJÖBERG, *RESTRUCTURING*, *supra* note 124, at 52.

environmental areas covered by a convention, GEF funding enables developing country signatories to fulfill their obligations.”

The genesis for the GEF is usually traced back to a 1989 French proposal, backed by a substantial financial commitment, to establish a fund of voluntary grants dedicated to the global environment.¹²⁹ In pilot phase, from 1991-1994, the GEF was characterized by a loose institutional structure, heavily influenced by the World Bank and the donor countries, with limited participation from developing countries.¹³⁰ It has been noted that donor countries also saw in the GEF a means to forestall a proliferation of funds, as well as discussions on alternative funding in the run-up to UNCED.¹³¹ Some saw the pilot phase as the first step in the direction of a more ambitious institution while others were adamant that it should only be temporary, filling the gap until the World Bank integrated environmental matters into its activities.¹³² Observers have stressed that, whatever its shortcomings, the pilot phase saw the establishment of the GEF in record time, despite the different and conflicting views with respect to formal structure and future of the entity.¹³³ During the pilot phase, and as it has continued to do, the Bank acted as trustee for the GEF and, with UNDP and UNEP, was also one of the implementing agencies responsible for drawing up proposals and implementing projects.

With the preparations for UNCED, and then its outcome, the dynamics around the GEF changed considerably. From a loose, collaborative structure between the Bank, UNDP and UNEP, the GEF was tossed into thick of environmental politics between industrialized and developing countries, which wanted a greater say in how the Fund was run. With disenchantment over the failure to match the lofty goals in Agenda 21 with new and additional resources, as well as the rejection by the donor countries of new funds for the Conventions then being negotiated, developing countries underlined that the GEF would have to be restructured.¹³⁴ In particular, they stressed that if the GEF was to serve as the financial mechanism for the Framework Convention, it would be required to “have an equitable and balanced representation of all Parties within a transparent system of governance.”¹³⁵

The arguments of the developing countries concerning balanced representation and accountability were designed to shift an institution characterized by the World Bank formula of one dollar, one vote towards the more universal decision-making process associated with the United Nations. Framed in political terms, developing countries wished to have an equal say and employed the language of accountability, transparency and equitable representation; donor nations naturally wished to retain control over the resources they provided and to this end fell back on

¹²⁹ BOISSON DE CHAZOURNES, *supra* note 124, at 5.

¹³⁰ The GEF was legally established by World Bank resolution 91-5 of March 1991, and the Bank controlled the trust fund, which put it in a very strong position. See BOISSON DE CHAZOURNES, *supra* note 124, at 8.

¹³¹ See SJÖBERG, *RESTRUCTURING*, *supra* note 124, at 7 and also Jordan, *supra* note 124, at 12, 19.

¹³² See SJÖBERG, *CREATION*, *supra* note 124, at 28-29. See also BOISSON DE CHAZOURNES, *supra* note 124, at 6 and SJÖBERG, *RESTRUCTURING*, *supra* note 124, at 7.

¹³³ BOISSON DE CHAZOURNES, *supra* note 124, at 6.

¹³⁴ *Id.* at 8.

¹³⁵ See UNFCCC, *supra* note 1, arts. 11(2) and 21(3).

arguments of efficiency and effectiveness. An example for more balanced representation already existed in the form of the Montreal Protocol Multilateral Fund, established in 1991, whose Executive Committee is evenly divided among developed and developing countries.¹³⁶ After a two-year negotiating process, which concluded in March 1994, there was agreement on a restructured institution that retained elements of the pilot phase, yet moved decisively in the direction of universal participation but without adopting the UN model. Participation in the GEF is open to any State member of the United Nations or any of its specialized agencies.¹³⁷ The incoming Chairman of the GEF, Mr. Mohamed T. El-Ashry concluded that: “The revised institutional framework represents a change from old-style assistance to new-style cooperation.”¹³⁸

The restructured GEF was not established as an international organization under treaty, but on a special legal basis where the States concerned gave their political assent to the Instrument for the Establishment of the Restructured Global Environment Facility, which in turn was adopted by the governing bodies of the three implementing agencies, with the latter step serving to establish the new GEF.¹³⁹ Of the bodies established by the Instrument, the most important is the Council, which serves as the main executive organ of the GEF.¹⁴⁰ Its composition proved contentious, with donor countries and developing countries vying for control. The 32 seats on the Council are split between developed countries (14) and developing countries (1) and countries with economies in transition (2), that is to say nations of Eastern and Central Europe and the Former Soviet Union.¹⁴¹ Decisions are to be made on the basis of consensus,¹⁴² failing which a formal vote may be held, in which case a double-weighted majority is necessary consisting of “an affirmative vote representing both a 60 percent majority of the total number of Participants and a 60 percent majority of the total contributions.”¹⁴³ The restructuring also saw the formalization of the legal relationship between the GEF and the Conferences of the Parties to the Framework Convention and Biodiversity Convention, provided for in the Conventions and the Instrument.¹⁴⁴

¹³⁶ Details of procedures and voting at http://www.multilateralfund.org/executive_committee.htm. See also UNEP/OzL.Pro.2/3.

¹³⁷ See GEF Instrument, *supra* note 125, para. 7.

¹³⁸ Mohamed T. El-Ashry, Commentary, *The New GEF*, ENVIRONMENT, Jul. 1994, at 36.

¹³⁹ BOISSON DE CHAZOURNES, *supra* note 124, at 10.

¹⁴⁰ Provision is also made for: an Assembly, consisting of representatives of all participating States, which meets every four years with the broad mandate to review the general policies and operations of the GEF; a Scientific and Technical Advisory Panel (STAP); and a “functionally independent” Secretariat. This latter development saw the Secretariat remain housed in the World Bank for administrative purposes, but not controlled by it. See BOISSON DE CHAZOURNES, *supra* note 124, at 12.

¹⁴¹ GEF Instrument, *supra* note 125, at para. 16.

¹⁴² *Id.* at para. 25(b).

¹⁴³ *Id.* at para. 25(c)(i).

¹⁴⁴ See UNFCCC, *supra* note 1, art. 11(3), Convention on Biological Diversity, *supra* note 21, art. 21(1), and GEF Instrument, *supra* note 125, at para. 20(g). For an overview process and legal issues involved in formalizing the relationship between the GEF and the COPs, see BOISSON DE CHAZOURNES, *supra* note 124, at 21. A legal opinion prepared by United Nations Legal Counsel, dated 23 August 1994, noted that the GEF’s parent institutions (the World Bank, UNDP and UNEP) had not bestowed on it the legal capacity of entering into legally binding arrangements or agreements, with the consequence that any such agreements approved by the GEF Council would have to be formalized by the World

Paragraph 9 of the GEF Instrument states that where the GEF serves as the financial mechanisms of, respectively the Framework Convention, the Biodiversity Convention and the Stockholm Convention “...the Council shall act in conformity with the policies, program priorities and eligibility criteria decided by the Conference of the Parties for the purposes of the convention concerned.”¹⁴⁵ The Memorandum of Understanding between the COP and the Council of the GEF, which gives effect to the respective roles and responsibilities of the two bodies, provides that the COP decides on “the policies, programme priorities and eligibility criteria related to the Convention for the financial mechanism which shall function under the guidance of and be accountable to the COP.”¹⁴⁶ It also states that “[t]he Council will ensure the effective operation of the GEF as a source of funding activities for the purposes of the Convention *in conformity with the guidance of the COP*” (emphasis added).¹⁴⁷ In practice, the COP issues “guidance”, while the GEF establishes operational procedures and detailed project eligibility rules for resource allocation. Accountability of the GEF to the COP takes the form of regular reporting on activities and resource programming proposals. Overall, while developing countries may use their clout in the COPs to draw up fairly expansive guidance, in the GEF it is the donor countries that set the agenda in the interpretation of COP guidance and its translation into concrete policies. In particular, groups of countries such as small island and Africa states criticise the GEF for not adhering more closely to the COP guidance. In legal terms, it is clear that the GEF Instrument and the MOU envisage the GEF being subject to the guidance of the COP, but not to function under its authority. This is an important distinction, and the provision that the GEF must action “in conformity” with such guidance does not alter the relationship much. The word “guidance” connotes something of a broader and policy-oriented character, contrasting for instance with “decisions”, “conclusions”, or “resolutions”.

The GEF exists to fund only the “incremental cost” of projects in order to achieve global environmental benefits.¹⁴⁸ The incremental cost is understood as that portion of the costs of a project conferring global benefits but which would not normally be in the interest of the host country to fund.¹⁴⁹ While relatively

Bank. See UN Doc. A/AC.237/74, annex, paras. 19-19. See also Robin R. Churchill & Geir Ulfstein, *Autonomous Institutional Arrangements in Multilateral Environmental Agreements: A Little-Noticed Phenomenon in International Law* 94 A.J.I.L. 623, 650-651 (2000).

¹⁴⁵ Similarly, para. 20(h) of the GEF Instrument, *supra* note 125, states that the Council shall “ensure that GEF-financed activities relating to the conventions...conform with the policies, program priorities and eligibility criteria decided by the Conference of the Parties for the purposes of the convention concerned”. The same language is echoed in para. 26, which provides that the “[t]he Council shall ensure the effective operation of the GEF as a source of funding activities...The use of the GEF resources for purposes of such conventions shall be in conformity with the policies, program priorities and eligibility criteria decided by the Conference of the Parties of each of those conventions.”

¹⁴⁶ Decision 12/CP.2, in *Report of the Conference of the Parties on its Second Session*, Addendum, Part II: Action taken by the Conference of the Parties, *Memorandum of Understanding between the Conference of the Parties and the Council of the Global Environment Facility*, para.2, FCCC/CP/1996/15/Add.1 (2002).

¹⁴⁷ *Id.* at para.4.

¹⁴⁸ GEF Instrument, *supra* note 125, art. 2.

¹⁴⁹ Incremental cost is defined as “a measure of the future economic burden on the country that would result from its choosing the GEF supported activity in preference to one that would have been sufficient in the national interest.” See GEF, INCREMENTAL COSTS, GEF/C.7/Inf.5 (Paper prepared

straightforward in the abstract, it is more difficult to apply the concept in practice, and has proved controversial. Arriving at a baseline, on the basis of which the incremental amount is assessed, may involve subjective judgments.¹⁵⁰ For instance, how does one assess what is in a country's national interest, or what course of action a country would have pursued? Critics have also questioned the feasibility, in physical and biological terms, of differentiating between national and global benefits.¹⁵¹ To this the response is "...that this is a conceptual distinction, or analytic tool, for the purpose of decisions on funding. It does not mean that in practice implementation of GEF projects is to be separate from other activities."¹⁵²

The basic objective of the GEF – helping developing countries contribute to the achievement of global environmental benefits – is an expression of the principle of common but differentiated responsibilities. As such, it is linked with, and buttressed by, concerns of international fairness and equity. Yet to the extent that donors control the institution, it mirrors the traditional model of aid as charity or enlightened self-interest, rather than a partnership. With the advent of more equitable representation the institution gained greater legitimacy.

5.4.2 Climate change funds

The preceding part has set out the genesis and basic operation of the GEF, while aspects of its operations relating to disbursement of resources were covered under technology transfer. As outlined above, the GEF acts as the financial mechanism for the Convention, and it functions under of, and is accountable to, the COP. At COP-7 in 2001, the parties established three new, dedicated climate change funds, each with their own mandate but all managed by the GEF. Two funds, the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF), were established under the Convention.¹⁵³ They are operated by the GEF, with the same relationship vis-à-vis the COP with respect to the existing institutional arrangements.¹⁵⁴ The Adaptation Fund (AF), established under the Protocol,¹⁵⁵ marks a break with these arrangements because the COP/MOP has decided that the Fund should "operate under *the authority* and guidance of and be accountable to" the COP/MOP (emphasis added).¹⁵⁶ The lion's share of the resources in all three funds will be dedicated to activities designed to assist countries adapt to climate change. In

for the April 1996 Meeting of the GEF Council), available at <http://www.gefweb.org/council/council7/c7inf5.htm>.

¹⁵⁰ SJÖBERG, RESTRUCTURING, *supra* note 124, at 52.

¹⁵¹ Jordan, *supra* note 124, at 31.

¹⁵² SJÖBERG, RESTRUCTURING, *supra* note 124, at 51-52.

¹⁵³ Decision 7/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, Addendum, Part II: Action taken by the Conference of the Parties, vol. I, FCCC/CP/2001/13/Add.1 (2002) (establishing the Special Climate Change Fund and the Least Developed Countries Fund).

¹⁵⁴ *Id.* Decision 7/CP.7 provides that two funds will be operated by the GEF "under the guidance of the COP".

¹⁵⁵ Decision 10/CP.7, in *Report of the Conference of the Parties on its Seventh Session*, Addendum, Part II: Action taken by the Conference of the Parties, vol. I, FCCC/CP/2001/13/Add.1 (2002). (establishing the Adaptation Fund).

¹⁵⁶ Decision 5/CMP.2, in *Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its second session*, Addendum, Part II: Action taken by the Conference of the Parties, para. 1(e), FCCC/KP/CMP/2006/10/Add.1 (2007).

this respect, the GEF itself has also established a financing window for adaptation, known as the Special Priority on Adaptation, to pilot adaptation activities.

Funding status – GEF and multilateral climate change funds

Fund	Amount US\$ million
GEF – Strategic Priority on Adaptation	49.0
LDC Fund	61.8
SCCF	53.3
Adaptation Fund	(figure unknown)
Total	164.1

Source: Compiled from GEF documents

The current and potential future funding from the climate change funds must be put into perspective against estimated adaptation financing needs. The costs of adaptation in developing countries remain highly uncertain, but an influential study on the economics of climate change estimated the costs required to adapt investments to climate risk at US\$ 40 billion, with a range of US\$ 10 – 100 billion.¹⁵⁷ Another study, which analyzed the additional investments and financial flows for adaptation in 2030, concluded that an estimated US\$ 28 – 67 billion could be required in developing countries.¹⁵⁸

5.4.2.1 Special Climate Change Fund

The Special Climate Change Fund (SCCF) finances activities, complementary to regular GEF climate change programs, under the following four “windows” provided for in paragraph 2 of decision 7/CP.7: (a) adaptation; (b) transfer of technologies; (c) energy, transport, industry, agriculture, forestry and waste management; and (d) activities to assist oil-exporting developing countries in diversifying their economies.¹⁵⁹ This last window is intended to give effect to article 4(8)(h) of the Convention, which concerns the adverse impact of mitigation measures on developing countries whose economies rely on fossil fuel exports. At COP-9 in 2003, the parties decided to assign priority to adaptation activities, while also agreeing that technology transfer and related capacity building activities were also essential.¹⁶⁰ That decision elaborates several adaptation activities that should be supported under the SCCF, including water resources management, infrastructure development, fragile ecosystems, improving the monitoring of disease vectors, supporting capacity-building for preventive measures, and strengthening national and regional centers and information networks for rapid response to extreme weather events.

¹⁵⁷ NICHOLAS STERN, THE ECONOMICS OF CLIMATE CHANGE, THE STERN REVIEW, CABINET OFFICE, HM TREASURY 442 (2006). See also THE WORLD BANK, CLEAN ENERGY AND DEVELOPMENT: TOWARDS AN INVESTMENT FRAMEWORK (2006).

¹⁵⁸ UNFCCC, INVESTMENT AND FINANCIAL FLOWS TO ADDRESS CLIMATE CHANGE para. 26 (2007)

¹⁵⁹ Decision 7/CP.7, *supra* note 153, para. 2.

¹⁶⁰ Decision 5/CP.9, *Report of the Meeting of the Parties on its Ninth Session*, Addendum, Part II: Action taken by the Conference of the Parties, vol. I, para. 1(c) -(d), FCCC/CP/2003/6/Add.1 (2004).

Based on the guidance from the COP, the GEF developed proposal for programming under the SCCF, which provides that the fund “be available to finance the additional costs of achieving sustainable development imposed on vulnerable countries by the impacts of climate change.”¹⁶¹ Thus the SCCF is complementary to the GEF Trust Fund because it may support adaptation activities that generate primarily local benefits, as opposed to the latter, which may be used to support adaptation activities primarily linked to producing global environmental benefits, for instance in the area of bio-diversity. In order to expedite the processing of financing, the GEF also proposed the adoption of a presumptive co-financing sliding proportional scale, set out in the table below. The share of funds that can be accessed under SCCF depends on the overall scale of the project. Where projects fall within the ambit of the sliding scale they can be approved without project-by-project negotiations to determine the additional costs of adaptation.

SCCF: Proposed sliding scale for co-financing

Total project cost (US\$)	Share covered by Fund
<\$1 million	up to 50%
<\$1.5 million	up to 33%
>\$5 million	up to 25%

Source: GEF

The GEF programming document sought to address donor concerns about the open-ended nature of financing under windows (c) and (d) by addressing only adaptation and technology transfer, which were highlighted in decision 5/CP.9. Furthermore, the document provides that while there is one Fund, contributions will be pledged and contributed for a specific program – for example adaptation - and separate financial records and accounts will be maintained for each program.¹⁶² Thus, although the decision 7/CP.7 provides that the SCCF will support activities in all four areas, the establishment of distinct programs and dedicated administrative arrangements permits donors to fund only those parts of the COP decision that they wish to support.¹⁶³ Donors have contributed US\$ 10.6 million for the program on technology transfer and US\$ 42.4 million for adaptation.¹⁶⁴ Some US\$ 25 million, roughly a quarter of the total cost, has been approved for eight projects.¹⁶⁵

Concerns were raised by some developing countries that the co-financing required under the sliding scale would effectively bar them from accessing the Fund, and that elements of the GEF programming document introduced new conditionalities that strayed into the mandate of the COP to set policies and

¹⁶¹ GEF, PROGRAMMING TO IMPLEMENT THE GUIDANCE FOR THE SPECIAL CLIMATE CHANGE FUND, GEF/C.24/12, para. 55 (2004).

¹⁶² *Id.* at para. 37.

¹⁶³ See M.J. Mace, *Funding for Adaptation to Climate Change: UNFCCC and GEF Developments since COP-7*, 14 (3) REVIEW OF EUROPEAN COMMUNITY AND INTERNATIONAL ENVIRONMENTAL LAW 225, 237 (2005).

¹⁶⁴ GLOBAL ENVIRONMENT FACILITY, STATUS REPORT ON CLIMATE CHANGE FUNDS AS OF APRIL 30, 2007 GEF/LDCF.SCCF.2/Inf.2,annex 2 (2007).

¹⁶⁵ GLOBAL ENVIRONMENT FACILITY, LDCF AND SCCF PROGRAMMING UPDATE, GEF/LDCF.SCCF.2/INF.3, 7 (2007).

priorities.¹⁶⁶ In decision 1/CP.12, adopted in 2006, the COP notes “the concerns expressed by most Parties not included in Annex I to the Convention with regard to the operational criteria and policies to be followed in financing activities under the Special Climate Change Fund during an initial five-year period” as set out in the programming document endorsed by the GEF Council.¹⁶⁷ In that decision the COP decided that the SCCF will be used to fund activities under paragraphs 2(d) and (e) of decision 7/CP.7, that is mitigation projects in areas such energy efficiency, as well as assisting oil-exporting countries with economic diversification.¹⁶⁸

The most recent status report for the SCCF states that funds available stood at US\$ 53.3 million.¹⁶⁹ Both the rather modest funding available to date, as well as the need to avoid duplication of regular GEF climate change activities, militates for projects to be carefully selected.¹⁷⁰ The Convention recognizes the specific needs and special situation of the LDCs with regard to funding and technology transfer.¹⁷¹

5.4.2.2 Least Developed Countries Fund

The LDC Fund (LDCF) is primarily charged with assisting least developed countries (LDCs) prepare and implement national adaptation programmes of action (NAPAs).¹⁷² These consist of a process designed to enable LDCs identify priority activities responding to their urgent and immediate adaptation needs.¹⁷³ The category of LDCs consists of 50 countries with low capital and human resources, and which therefore have limited ability to adapt to the adverse effects of climate change. The most recent status report for the LDCF states that an amount of US\$ 9.8 million had been disbursed for projects and assets stood at US\$ 52 million.¹⁷⁴

Although managed by the GEF, modifications have been made so that certain of that institution’s normal procedures are not applicable to the LDCF.¹⁷⁵ One of these is the concept of “incremental costs” – additional costs associated with transforming a project with national benefits into one with global environmental

¹⁶⁶ Mace, *supra* note 163, at 238.

¹⁶⁷ Decision 1/CP.12, in *Report of the Meeting of the Parties on its Twelfth Session*, Addendum, Part II: Action taken by the Conference of the Parties, vol. I, FCCC/CP/2006/5/Add.1 (2007).

¹⁶⁸ *Id.* decision 1/CP.12, paras. 1 and 2.

¹⁶⁹ GLOBAL ENVIRONMENT FACILITY, STATUS REPORT ON CLIMATE CHANGE FUNDS, *supra* note 164, at 2

¹⁷⁰ The GEF is developing guidelines for activities under the SCCF, see *Report of the GEF to the Tenth Session of the Conference of the Parties to United Nations Convention on Climate Change*, 7 October 2004, annex d, contained in *Report by the GEF to the Conference of the Parties*, Note by the Secretariat, FCCC/CP/2004/6.

¹⁷¹ UNFCCC, *supra* note 1 art. 4(9).

¹⁷² Decision 5/CP.7, in *Report of the Meeting of the Parties on its Seventh Session*, Addendum, Part II: Action taken by the Conference of the Parties, vol. I, para. 12, FCCC/CP/2001/13/Add.1 (2002). See also Mace, *supra* note 163, at 238-240.

¹⁷³ The COP has set out detailed guidelines for the preparation of national adaptation programmes of action. See decision 28/CP.7, in *Report of the Meeting of the Parties on its Seventh Session*, Addendum, Part II: Action taken by the Conference of the Parties, vol. IV, FCCC/CP/2001/13/Add.4 (2002).

¹⁷⁴ GLOBAL ENVIRONMENT FACILITY, STATUS REPORT ON CLIMATE CHANGE FUNDS, *supra* note 164, at 3.

¹⁷⁵ GLOBAL ENVIRONMENT FACILITY, PROGRAMMING PAPER FOR FUNDING THE IMPLEMENTATION OF NAPAS UNDER THE LDC TRUST FUND, GEF/C.28/18, para. 5 (2006). Thus the principle of financing incremental costs for global benefits and the Resource Allocation Framework are not applicable to the LDCF or the SCCF. However, the double-majority voting procedure is applicable.

benefits – that guides GEF financing under its main Trust Fund.¹⁷⁶ In practice concept is contentious and, more importantly, adaptation activities by definition deliver local and not global benefits. The LDCF will support the “additional costs” arising from meeting the extra adaptation needs imposed on LDCs by the effects of climate change.¹⁷⁷ In a situation where a community is planning to construct a water supply system, the additional costs covered by the Fund would consist only of the added expense of ensuring that the infrastructure can cope with the expected increase in flooding and droughts from climate change. The underlying cost of the water supply system – before “climate-proofing” – falls to the community and is not covered by the Fund. The portion supported by the Fund is thus the difference between the baseline scenario and the adaptation scenario. In short, in practice the additional costs requirement seems very close to the concept of incremental costs. It is not clear where the formula of “additional costs” leaves projects that might not be necessary at all in the absence of climate change, for instance planning for and implementing coastal defense measures.

In order to simplify the operation of the additional cost criterion in practice, the GEF has proposed an optional sliding scale for determining the portion of financing eligible under the LDCF. Recognizing the particular vulnerability of LDCs, the sliding scale for use under the Fund requires less co-financing for smaller projects than the scale proposed for the SCCF.¹⁷⁸ Smaller projects focusing on capacity building activities are almost certain to be additional – without climate change there would be no need for them. Accordingly, for such projects the sliding scale provides that Fund will cover the full, or almost the full, cost of the activity. The proposed sliding scale, set out in the table below, requires considerably less co-financing than an earlier GEF proposal that was subject to criticism from small islands and African countries at COP-10.¹⁷⁹

¹⁷⁶ See GLOBAL ENVIRONMENT FACILITY, INCREMENTAL COST POLICY PAPER (1996), available at <http://www.gefweb.org/council/council7/c7inf5.htm>.

¹⁷⁷ GLOBAL ENVIRONMENT FACILITY, PROGRAMMING PAPER FOR FUNDING THE IMPLEMENTATION OF NAPAS UNDER THE LDC TRUST FUND, *supra* note 175, at paras. 18-20. In decision 6/CP.9, *supra* note 160, at para. 3(c), the COP requested the GEF to consider “[c]riteria for supporting activities on an agreed full-cost basis”, which is a somewhat confusing formulation. However, in decision 3/CP.11, in *Report of the Meeting of the Parties on its Eleventh Session*, Addendum, Part II: Action taken by the Conference of the Parties, para. 2, FCCC/CP/2005/5/Add.1, the COP stated that “full-cost funding shall be provided by the Least Developed Countries Fund to meet the additional costs of activities to adapt to the adverse impacts of climate change”. A footnote provides that for “this decision ‘additional costs’ means the costs imposed on vulnerable countries to meet their immediate adaptation needs.”

¹⁷⁸ GLOBAL ENVIRONMENT FACILITY, PROGRAMMING PAPER FOR FUNDING THE IMPLEMENTATION OF NAPAS UNDER THE LDC TRUST FUND, GEF/C.28/18 para. 29 (2006).

¹⁷⁹ Mace, *supra* note 163, at 239. The proposed sliding scale is set out in GEF, ELEMENTS TO BE TAKEN INTO ACCOUNT IN FUNDING THE IMPLEMENTATION OF NAPAS UNDER THE LDC FUND, GEF/C.24/Inf.7, para. 22 (2004). For projects up to \$250,000 it was proposed to cover a maximum of half the cost and for projects between \$2-5 million a third of the cost. See http://www.gefweb.org/Documents/Council_Documents/GEF_C24/gef_c24.html, last accessed 29 April 2007.

LDC Fund: Proposed sliding scale for co-financing

Total project cost (US\$)	Share covered by Fund
<\$300,000	up to 100%
<\$500,000	up to 75% or max. of \$375,000
<\$6 million	up to 50% or max. of \$3 million
<\$18 million	up to 33% or a max. of \$6 million
>\$18 million	up to 25% or max. determined by overall LDCF funding availability

Source: GEF

A review of the LDCs that have submitted NAPAs - 14 of a total of 49 as of April 2007 - reveals that these countries have identified immediate priority adaptation needs of about US\$ 314 million.¹⁸⁰ This compares unfavorably with the US\$52 million that remains available in the LDCF.¹⁸¹ Once remaining 35 LDCs submit their NAPAs, the cumulative funding required could quite possibly exceed US\$ 1 billion. Assuming that this figure represents the total cost as estimated by the countries concerned – which is in fact the case with almost all NAPAs submitted to date – then what would constitute the approximate value of the “additional cost”? This is the amount to be covered by the LCDF, determined either in accordance with a sliding scale or on a project-by-project basis. An overview of projects proposed indicates that many fall in the range where financing on the sliding scale would be either full or three-quarters of the project cost. (In comparison, the ratio of GEF resources to co-financing in the overall GEF Trust Fund, which stands at about 1 to 4.¹⁸²). Assuming conservatively that the full cost of all priority projects identified in the NAPAs amounts to US\$ 1 billion, this could imply funding needs in the region of US\$ 300 to 500 million, or around six to ten times the currently available amount from the LCDF. It must also be borne in mind that the NAPAs are intended to identify only the most immediate and pressing adaptation needs; the full extent of adaptation funding required is much higher. The first six NAPAs have been approved for funding, with the Fund covering US\$ 15 million, roughly a third of the total cost.¹⁸³

In conclusion, for the LCDF to meaningfully fulfill its functions donors would have to substantially increase their contributions. In equity terms, the LCDF is intended to assist those countries who are likely to be hardest hit by climate change,

¹⁸⁰ Authors calculations based on NAPAs submitted to the UNFCCC Secretariat and made available on the website at <http://unfccc.int/adaptation/napas/items/2679.php>. Of the 14 countries, the NAPA of Niger does not provide any costing for the projects identified. Calculations based on estimated total project cost, except where countries have identified the proposed GEF share and co-financing, as in the case of Haiti.

¹⁸¹ See text accompanying note 174. Decision 6/CP.9, *supra* note 160, at para. 2, directs the GEF to support the implementation of NAPAs as soon as possible after their completion.

¹⁸² Every \$1 of GEF financing leverages almost \$4 in co-financing. See GLOBAL ENVIRONMENT FACILITY, ANNUAL REPORT 2005 3 (2006).

¹⁸³ GLOBAL ENVIRONMENT FACILITY, LDCF AND SCCF PROGRAMMING UPDATE, *supra* note 165, at 3-4.

possess the lowest adaptive capacity, and have contributed least to rising concentrations of GHGs.

5.4.2.3 Adaptation Fund

The Adaptation Fund (AF) was established at COP-7 in 2001, pursuant to article 12(8) of the Kyoto Protocol, which provides that the COP serving as the meeting of the parties to the Protocol “shall ensure that a share of the proceeds from” CDM projects is used “to assist developing countries that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation”. The Adaptation Fund is intended to finance concrete adaptation projects and programs in developing countries that are parties to the Protocol, which will include activities in the areas of natural resources management, improving the monitoring of diseases and vectors affected by climate change, and supporting capacity building for preventive measures and preparedness for disasters relating to climate change.¹⁸⁴ According to principles meant to guide the Fund, it will “operate under the authority and guidance of and be accountable to” the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (COP/MOP) “which shall decide on its overall policies”.¹⁸⁵ An important feature that distinguishes the Adaptation Fund from the other funds is that its governing body has a majority of members from developing countries (non-Annex 1) and follows a one-country-one vote rule, as opposed to the “double majority” of the other funds under the GEF voting system.¹⁸⁶ At the Bali Conference in December 2007, the COP/MOP decided that the GEF would manage Adaptation Fund, on an interim basis.¹⁸⁷ The parties have decided that the AF will fund projects and programs to address the adverse effects of climate change on a “full adaptation cost basis”.¹⁸⁸

Pursuant to article 12(9) of the Protocol, the Fund is financed by a two per cent share of the proceeds from clean development projects, with the exception of projects situated in LDCs.¹⁸⁹ In addition to the share of proceeds, the AF is also intended to receive contributions from Annex 1 parties that have ratified the Protocol.¹⁹⁰ The resources available from the AF depend on the total number of CERs issued and the value obtained when they are monetized, both variables that are subject to some uncertainty. A recent analysis puts the projected supply of CERs spanning a range from 1.9 to 4.4 billion.¹⁹¹ The most recent market survey reveals

¹⁸⁴ See decisions 5/CP.7 and 10/CP.7, *supra* note 172.

¹⁸⁵ Decision 5/CMP.2, *supra* note 156, at para. 1(e).

¹⁸⁶ *Id.* See chapter 3 for more details.

¹⁸⁷ Decision 1/CMP.3, adopted at the Third Session of the Conference of the Parties serving as the Meeting of the Parties, 3-15 December 2007, advance, unedited copy available on the website of the UNFCCC secretariat, http://unfccc.int/files/meetings/cop_13/application/pdf/cmp_af.pdf. See chapter 3 for more details.

¹⁸⁸ Decision 5/CMP.2, *supra* note 156, at para. 1(d).

¹⁸⁹ See decision 10/CP.7, in *Report of the Meeting of the Parties on its Seventh Session*, Addendum, Part II: Action taken by the Conference of the Parties, vol. I, para. 2, FCCC/CP/2001/13/Add.1 (2002) and decision 17/CP.7, *Report of the Meeting of the Parties on its Seventh Session*, Addendum, Part II: Action taken by the Conference of the Parties, vol. II, para. 15(a)-(b), FCCC/CP/2001/13/Add.2 (2002).

¹⁹⁰ See decision 10/CP.7, *supra* note 189.

¹⁹¹ AXEL MICHAELOWA, CLIMATE STRATEGIES, HOW MANY CERS WILL THE CDM PRODUCE BY 2012? (Discussion Paper CDM-2) 7 (2007). The Secretariat of the UNFCCC projects a supply of more

that the weighted average price of CERs was of US\$ 10.90, with most transactions in the range of US\$ 8-14.¹⁹² One observer estimates that the Fund may generate between US\$ 160 and US\$ 950 million, dwarfing cumulative contributions to the LDC and the Special Climate Change Funds, which in 2007 stood at roughly US\$ 110 million.¹⁹³ Calculations based on the potential supply of CERs suggest that Fund could yield between US\$ 414 and US\$ 959 million.¹⁹⁴ The viability of the Fund depends very much on the continuation of the CDM or similar interest under a post-2012 climate agreement.

The brief overview the three climate funds underlines the preoccupation of developing countries with adaptation, which is quite understandable given the threats they face from the adverse effects of climate change. Since adaptation activities are by definition local, and thus do not provide global benefits, they are not eligible for funding under the GEF. One might also expect that this would influence the willingness of donor countries to fund adaptation projects. Overall, it seems fairly clear that the financial resources committed to the funds are only a very modest first step to address the adaptation funding needs of developing countries. At the seventh Conference of the Parties, Marrakesh, the European Union, together with a number of other industrialized countries, pledged to collectively contribute Euro 450/US\$ 410 annually by 2005 to the GEF climate change activities and the climate change funds.¹⁹⁵ Donor countries will need to deliver on pledges such as these if the climate change funds are to address the pressing adaptation needs of developing countries.

5.5 Conclusions

This chapter has analyzed the principle of common but differentiated responsibilities from a theoretical perspective. Although equal application of the law, derived from the principle of the sovereign equality of states is the norm under international law, forms of differentiation exist, particularly in the field of international environmental law. Various justifications have been advanced for differentiation: as a means to promote a “shared” compact to tackle global problems,

than 2.6 billion CERs by 2012, but this is a straight extrapolation that does not account for non- or under-delivery by some projects. See <http://cdm.unfccc.int/Statistics/index.html>, last accessed 6 February 2008.

¹⁹² See KARAN CAPOOR & PHILIPPE AMBROSI, WORLD BANK, STATE AND TRENDS OF THE CARBON MARKET 2007 4, 31 (2007), available at http://carbonfinance.org/docs/Carbon_Trends_2007-FINAL_-_May_2.pdf, last accessed 6 February 2008.

¹⁹³ BENITO MUÉLLER, OXFORD INSTITUTE FOR ENERGY STUDIES, NAIROBI 2006: TRUST AND THE FUTURE OF ADAPTATION FUNDING 3 (2007).

¹⁹⁴ The figures are calculated based on potential range in supply of 1.9 to 4.4 billion CERs, as suggested by MICHAELOWA, *supra* note 191, at 7, and applying a CER price of US\$10.9, which is the most recent average price available.

¹⁹⁵ Statement by Belgium on behalf of the European Commission, its Member States and Canada, Iceland, New Zealand, Norway, and Switzerland, *Note by the Secretariat, Statements made in connection with the approval of the Bonn Agreements on the implementation of the Buenos Aires Plan of Action (decision 5/CP.6)*, FCCC/CP/2001/MISC.4. The relevant section paragraph states: “We are prepared to contribute US \$ 410 million, which is 450 million Euro, per year by 2005 with this level to be reviewed in 2008. Funding to be counted can include: contributions to GEF climate change related activities; bilateral and multilateral funding additional to current levels; funding for the special climate change funds, the Kyoto Protocol Adaptation Fund and the LDC fund; and funding deriving from the share of proceeds of the clean development mechanism following entry into force of the Kyoto Protocol.”

as a way of reflecting the responsibility for environmental degradation, and to reflect that notion that on account of their greater financial and technical resources industrialized countries ought to take the lead in combating global environmental problems. The conclusion reached in this chapter is that the principle of common but differentiated responsibilities gives effect to conceptions of equity and fairness in international environmental law and policy-making. The accepted view among most scholars is that the principle has not attained the status of customary international. And while it is submitted that this conclusion is correct, it should not lead one to dismiss the principle as of no relevance to the international legal and policy discourse on climate change. The view adopted here is that the principle of common but differentiated responsibilities is a background principle straddling the divide between the legal and the political in international forums on sustainable development. On the one hand the principle reflects political realities and interests, on the other it appears in legal instruments and is used to justify, explain and interpret legal obligations.

The principle of common but differentiated responsibilities may risk being regarded as contributing to the lack of progress on international climate policy, perhaps leading some to claim in exasperation that it means no, rather than common, commitments for developing countries. Admittedly, for those desiring agreement on a climate policy that binds all major emitters to limit or cut emissions, the invocation of the principle can appear to be little more than a blocking maneuver. Yet in these circumstances the principle of common but differentiated responsibilities provides the vital service of encouraging a consideration of context and differences in circumstances among countries facing a global threat, with widely varying resources at their disposal, and with varying assessments of priorities and expectations of impacts. In such an international system, which lacks an arbiter of last resort, it is not surprising that the principle of common but differential responsibilities is something of a messy conglomerate, subject to range of interpretations.

What are the limits to the application and interpretation of the principle? Two boundaries that have been suggested are: first, the differentiation must contribute to the achievement of the common environmental goal, and second, that it must cease when the relevant differences no longer exist.¹⁹⁶ Thus, in the context of the Convention, the principle must contribute to the achievement of its ultimate object, namely the stabilization of greenhouse gases in the atmosphere at a level that is not dangerous. Although historical responsibility for the accumulation of greenhouse gases must be taken into account, the common commitment to Convention's ultimate objective places limits on the differentiation in favor of developing countries that are large emitters, whether measured in absolute or per capita terms. To avoid a slide into unfairness, the second boundary suggests that differentiation should be time-bound and subject to review of whether the relevant differences continue to prevail.¹⁹⁷ Since countries disagree on what constitutes "relevant differences" justifying differentiation, this may be more difficult than it seems.

This chapter also covered the practical application of differentiation in the climate regime, in the form of the institutions and mechanisms to promote

¹⁹⁶ RAJAMANI, *supra* note 18, at 253-254.

¹⁹⁷ RAJAMANI, *supra* note 18, at 254.

technology transfer and financial assistance to combat climate change. With respect to options for accelerating the transfer and diffusion of clean energy technology, it appears clear that the general trend towards market-based solutions will continue, so that mechanisms such as partnerships, joint ventures, and licensing arrangements will be continue to be of importance. The question is whether this is enough to get the job done – will developing countries be able to afford cleaner technologies and adopt them in sectors where they have the greatest impact. At the international level, investment and subsidies should shifted from fossil fuels to cleaner energy, including, but not limited to renewables, as it should be recognized that large-scale electrification simply cannot, at this stage, be carried out with wind or solar energy, and providing access to basic energy services would have a negligible impact on global carbon dioxide emissions. Re-allocating subsidies and investment would apply to the World Bank, bi-lateral aid agencies, import-export banks. The Global Environment Facility would need to have its funding significantly augmented.

In a future climate agreement, consideration should also be given to the strengthening the provisions related to research, development and deployment of cleaner technology, perhaps in the form of clean technology protocol, which would include provisions related to technology transfer. A greater emphasis on technology, whether in the form of a protocol or not, should seek to achieve three things: first, consensus on significant action by group of countries that are the greatest contributors to GHG emissions, recognizing that a different strategy of a different scale and scope is required; second, augmenting those funds to transfer technology to the least developed countries, which would assure them that they will not be left out, thus minimizing opposition to initiatives comprising major emitters; and three, a range of voluntary commitments and partnerships specifically aimed at clean and low emissions technology.

Finally, the international community is in 2008 on the cusp of defining the next stage of the collective effort to combat climate change. It is not unexpected that the principle of common but differentiated responsibilities is coming to the fore once more. Although the world has changed a great deal since the adoption of key milestones in the area of climate change and sustainable development – the Rio Conference and adoption of the Convention in 1992 and the Kyoto Protocol in 1997 – basic differences in wealth, perception and outlook persist among nations. Confronting the worsening environmental outlook demands a forward-looking interpretation of principle of common but differentiated responsibilities. In fashioning such an interpretation, the parties must creatively articulate and give effect to common responsibilities, while also accounting for the very real and relevant differences among members of the international community.

Chapter 6 -Evaluation of proposals for future climate policy

6.1 Introduction

There are a great number of ideas on how to design the next phase of the climate regime. While some proposals are variations on basic themes, a recent survey of approaches for advancing international climate policy counted 40 proposals.¹ This chapter outlines the features of a number of the main proposals and assesses them according to equity criteria. Accordingly this chapter begins with an overview of the various assessment criteria for a future climate change agreement – and the burden-sharing rules they contain – reflect general principles of fairness. Although equity is the subject of this study, it is only one among a range of criteria by which to assess climate policy proposals. Consistency with principles of equity and fairness is of limited use if the proposal at issue is politically unacceptable and of limited feasibility in policy. Accordingly, this chapter also seeks to evaluate the proposals against a number of assessment criteria drawn from the literature on the subject.² The chapter sets out to do two things. First, it sets out a set of policy criteria that are for evaluating climate change proposals. Second, it assesses a small, but representative sample of actual proposals in the light of both equity principles and the set of policy criteria.

Earlier it was concluded that no single account of equity or fairness could satisfy the demands placed on it by parties with competing conceptions of what is fair and just and divergent material interests.³ Instead a promising approach is to identify different aspects or dimensions of equity and apply them in the analysis. Accordingly, in a previous chapter the following general fairness and equity principles were selected as representative and useful in the climate change context: egalitarian; responsibility or contribution; need; and capability. Taking one step further it is in the analysis of equity and fairness one can usefully distinguish: (a) general principles of fairness and equity operating at a high level of generality; (b) more specific burden-sharing rules, which incorporate concrete applications of one or more general principles; and (c) operational indicators for putting in place of burden-sharing proposals.⁴ An example of a burden-sharing rule would be the “Brazilian proposal” to allocate mitigation targets on the basis of the impact of historical emissions on temperature increase. In this case the operational indicators

¹ DANIEL BODANSKY, INTERNATIONAL CLIMATE EFFORTS BEYOND 2012: A SURVEY OF APPROACHES, PEW CENTER ON GLOBAL CLIMATE CHANGE (2004).

² The following part draws on criteria used by BODANSKY, *supra* note 1; AARON COSBEY ET AL WHICH WAY FORWARD? ISSUES IN DEVELOPING AN EFFECTIVE CLIMATE REGIME AFTER 2012, INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT (2005); JOSEPH E. ALDY, SCOTT BARRETT & ROBERT N. STAVINS, THIRTEEN PLUS ONE: A COMPARISON OF GLOBAL CLIMATE POLICY ARCHITECTURES, RESOURCES FOR THE FUTURE (2003); Axel Michaelowa, Kristian Tangen & Henrik Hasselknippe, *Issues and Options for the post-2012 Climate Architecture- An Overview*, 5 INTERNATIONAL ENVIRONMENTAL AGREEMENTS 5, 16-18 (2005).

³ See chapter 4.

⁴ CICERO & ECN, SHARING THE BURDEN OF GREENHOUSE GAS MITIGATION, FINAL REPORT OF THE JOINT CICERO-ECN PROJECT ON THE GLOBAL DIFFERENTIATION OF EMISSION MITIGATION TARGETS AMONG COUNTRIES 13-14 (2001).

would consist of the methodologies for calculating historical emissions, as well as for deriving changes in average mean surface temperature.

This part sets out a range of policy criteria for assessing climate change proposals, beginning with an overview of the manner in which targets and commitments are framed.⁵ The framing of the target has implications for the perceived fairness of a proposal, as well its political acceptability. The first approach is that followed in the Kyoto Protocol - fixed emission limitation and reduction targets, measured against a fixed baseline, with default set at 1990 emission levels. The setting of differentiated targets makes it possible to reflect equity concerns and the individual circumstances of countries. In theory, more rational methods can be applied to determine targets than the “climate bazaar” haggling that characterized the Kyoto negotiations. Because economic growth is uncertain over longer periods of time, such as the 5-10 years commonly mentioned, opponents point out that fixed targets have the potential to become straitjacket. For this reason, a number of more flexible types of targets have been proposed, such as indexing the emissions commitment to a variable such as economic growth. Another variant is a GHG intensity target, which allows absolute emissions to increase, but commits a country to reducing the GHG emissions per unit of economic output. An emissions intensity target is a key component of the current U.S. climate policy.⁶ Since uncertainty about economic growth and overall development is greatest for developing nations, intensity targets are often suggested as especially appropriate for this category of states. Seen more generally, such targets are regarded as a means to broaden participation in a future climate agreement, which has the beneficial effect of countering “leakage” – the movement of industries from regions subject to controls to those that are not, with the associated competitiveness concerns – and broadening the market for emissions trading, thus lowering abatement costs. Intensity targets tend to be set so that absolute emissions continue rising, yet atmospheric stabilization of GHGs requires that emissions from industrialized countries begin to decline in absolute terms. This suggests that such targets are more suited for developing countries.⁷

Another approach that is designed to provide flexibility is “no lose” targets, which are non-binding emission limitation or reduction commitments; exceeding them has no compliance implications, but if emissions are held below the target, the difference could be sold on the carbon market. By creating an incentive to mitigate without punishing shortfalls, this type of mechanism could contribute to the mitigation objective, as well as promoting equity and inclusivity because less-

⁵ BODANSKY, *supra* note 1, at 10-13; CÉDRIC PHILIBERT, INTERNATIONAL ENERGY AGENCY, CLIMATE MITIGATION: APPROACHES FOR FUTURE INTERNATIONAL COOPERATION, COM/ENV/EPOC/IEA/SLT(2005)10 (2005).

⁶ The National Climate Action Plan sets an intensity reduction of 2 per cent per year. Critics charge that the target amounts to “business-as-usual” and will not require any effort to meet. During the period 1990-2004, U.S. emissions have risen by 15.4 per cent while GDP increased by 51 per cent, ENVIRONMENT PROTECTION AGENCY, INVENTORY OF U.S. GHG EMISSIONS AND SINKS: 1990-2004 (2006), <http://epa.gov/climatechange/emissions/usinventoryreport.html>. It is projected that emissions will grow by 11.2 per cent from 2002-2012, Andrew C. Revkin, *U.S. Predicting Steady Increase for Emissions*, NY TIMES March 3, 2007.

⁷ NIKLAS HÖHNE & ESTHER LAHME, TYPES OF FUTURE COMMITMENTS UNDER THE UNFCCC AND THE KYOTO PROTOCOL POST 2012 (WWF Briefing Paper 8, 2005).

developed countries could benefit from emissions trading. The targets could be applied to the country as a whole or only to specified sectors.⁸ Reflecting the same rationale, but on the basis of GHG intensity not fixed emission targets, are dual intensity targets. A country would have two targets – one, a relatively weak but binding compliance target, and two, a more stringent selling target, which if bettered would entitle the country to sell the surplus.⁹ Other approaches modify a system of fixed emission targets through the incorporation of a safety valve, which effectively caps the price of permits by allowing parties to purchase additional allowances at a pre-determined price. Knowledge of the maximum permit price could foster participation and enhance compliance, but could also reduce certainty with respect to abatement levels.

Rather than setting targets, mitigation objectives can also be pursued through laws and regulations that prescribe policies and measures. One prominent example of a potential policy is a harmonized global carbon tax. Economic theory suggests in theory that taxes are preferable to price instruments – emissions trading schemes – for tackling problems such as climate change.¹⁰ In many countries, not least the United States, political reality dictates that for all their theoretical merit carbon taxes are unlikely to be widely adopted. A number of European countries, among them Norway and Switzerland, have adopted taxes on carbon as part of their portfolio of climate policies.¹¹ From the perspective of developing countries, a globally harmonized carbon tax would be rejected on equity grounds as regressive. Other policies and measures (PAMs) approaches include the setting of international energy efficiency standards, establishment of technology standards more generally, and a “soft” technology model that focuses financing for energy technology R&D, technology cooperation and support for the deployment of new technologies. An interesting variation is the sustainable development policies and measures (SD-PAMs) proposals where countries pledge to carry out policies aimed at meeting a country’s economic and social development objectives, but that also contribute to GHG mitigation, and in the longer-term on a more climate-friendly development pathway.¹² There is increased in SD-PAMs as a bridge between countries with binding targets and those without.¹³ The financial incentives for SD-PAMs are likely

⁸ For a recent sector-based proposal see JAKE SCHMIDT ET AL, CENTER FOR CLEAN AIR POLICY, SECTOR-BASED APPROACH TO THE POST-2012 CLIMATE CHANGE ARCHITECTURE (2006), <http://www.ccap.org/international/future.htm>.

⁹ BODANSKY, *supra* note 1, at 11.

¹⁰ Richard G. Newell & William A. Pizer, *Regulating Stock Externalities Under Uncertainty*, Discussion Paper 99-10-REV, RESOURCES FOR THE FUTURE, 1, 1-2 (2000). The classic analysis on the merits of prices versus quantities is M.L. Weitzman, *Prices vs. Quantities* 41(4) REVIEW OF ECONOMIC STUDIES, 477-491 (1974).

¹¹ For details see IEA, CLIMATE CHANGE MITIGATION: GREENHOUSE GAS POLICIES AND MEASURES, <http://www.iea.org/textbase/pm/Default.aspx?mode=cc>, database searched for “taxes” under policies in force, last accessed 3 January 2007.

¹² KEVIN A. BAUMERT ET AL, WRI, GROWING IN THE GREENHOUSE: PROTECTING THE CLIMATE BY PUTTING DEVELOPMENT FIRST (2005).

¹³ JANE ELLIS ET AL, IEA, SD-PAMS: WHAT, WHERE, WHEN AND HOW? 5 (2007). SD-PAMs have been extensively discussed in the climate negotiations. Interestingly, the Bali Action Plan adopted at the 13th Session of the Conference of the Parties (COP-13), held from 3-14 December 2007, refers to “Nationally appropriate mitigation actions by developing country Parties *in the context of sustainable*

to be related to the degree of oversight and review of the implementation of the pledges.

6.2 Assessment criteria

The next part of this chapter explores assessment criteria that have been proposed in the literature to evaluate international climate policy proposals. The coverage is intended to be representative, not exhaustive.

6.2.1 Environmental effectiveness

Environmental effectiveness is first on the list of assessment criteria. A proposal should be capable of achieving a particular stabilization level of greenhouse emissions that avoids dangerous climate change, as required by Article 2 of the Convention. This author supports the view that provision establishes a legal obligation on the parties to prevent dangerous interference with climate system.¹⁴ However, in the absence of a common understanding of what constitutes dangerous interference, various parties and interest groups have advocated different views on what constitutes an adequate degree of environmental commitment.¹⁵ Nonetheless, even absent consensus, there is over time likely to be considerable convergence around what constitutes a long-term goal for the climate regime. Improved understanding of the timing, impacts and costs of climate change is likely to be an important driver. In this respect, the scientific input of the IPCC provides decision-makers and the public with information on which to adopt decisions to mitigate the risk associated with climate change.

Stabilization of atmospheric concentrations of greenhouse gases in this century at any level will necessitate a substantial departure from business-as-usual emissions.¹⁶ Studies suggest that depending on the stringency of chosen target, global GHG reductions of 25-70 percent below 2005 levels may be necessary by 2050, while by the end of the 21st century emissions must be 80 per cent below current levels.¹⁷ Several emission paths are possible in achieving a particular stabilization

development supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner..." para. 1(b)(ii), (emphasis added).

¹⁴ See RODA VERHEYEN, CLIMATE CHANGE AND INTERNATIONAL LAW: PREVENTION DUTIES AND STATE RESPONSIBILITY 56 (2005). But cf Daniel Bodansky, *The United Nations Framework Convention: A Commentary*, 18 YALE JOURNAL OF INTERNATIONAL LAW 451, 500 (1993). Bodansky notes that Art.2 is phrased in declarative language. He also questions whether Art.2 falls within in the category of "object and purpose" of the treaty, as provided for by Arts. 18 and 31 (1) of the Vienna Convention on the Law of Treaties. In that case all parties would be under an obligation not to defeat the stabilization objective. Contrary to Bodansky's close reading, the practice of the parties in reiterating and reaffirming the stabilization objective in the course of climate negotiations, as well as in various soft law or political instruments such as the Johannesburg Plan of Implementation, have demonstrated the centrality of Art. 2.

¹⁵ For instance the EU target of avoiding warming of more than 2 degrees Celsius above pre-industrial levels.

¹⁶ Jan Corfee-Morlot & Niklas Höhne, *Climate change: long-term targets and short-term commitments*, 13 GLOBAL ENVIRONMENTAL CHANGE 277, 278 (2003).

¹⁷ NICHOLAS STERN, CABINET OFFICE, HM TREASURY, THE ECONOMICS OF CLIMATE CHANGE, THE STERN REVIEW 193 (2006), http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

level, leading some to argue for delayed mitigation in order to avoid the premature retirement of capital stock.¹⁸ An opposite view holds that early action is warranted due to the inertia and slow turnover of capital stock such as power plants and buildings, making it especially important not to “lock in” old technology.¹⁹ The International Energy Agency’s estimate that the world energy system will require \$16 trillion in new investments by 2030 tends to support the latter view.²⁰ A later peak in emissions implies that cuts must occur at a higher rate in the future – delaying the peak in emissions from 2020 to 2030 almost doubles the rate of reduction for one widely discussed stabilization target.²¹ Overall, “[t]he earlier the emissions peak and decline, the lower the stabilized concentration level, the lower the absolute level of climate change and the earlier that climate change is attenuated.”²²

Emissions from developing countries are set to overtake those of industrialized countries within the next two decades.²³ Accordingly, achievement of a stabilization target, even one at the high end, requires the participation of at least the major emitters among the developing countries. There is thus a tension between environmental effectiveness and equity, as reflected in the differential treatment under the principle of common but differentiated responsibilities. In case of a conflict, the stabilization objective enshrined in article 2 overrides applicable equity provisions in the Convention. Article 3(1), which contains a number of principles, refers to the need for parties to “protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.” In achieving the objective of the Convention and implementing its provisions, the parties “shall be guided” by the above principles and others listed in article 3. The principles of equity and fairness reflected in article 3(1) may thus actively influence, guide and possibly shape the actions and policies implemented to achieve the stabilization objective. However, these principles cannot direct or determine policies in a manner that would clash with the objective of the Convention. In sum, in legal terms article 2 acts as a gatekeeper with respect to at least some equitable proposals for combating climate change. In other words, proposals must pass a threshold of environmental adequacy.

At the policy design level, environmental effectiveness is influenced by factors such as leakage (movement of emissions-generating activities to a region with weaker controls) and the efficacy of enforcement and compliance procedures.²⁴ Drawing on research analyzing the “pollution haven thesis”, some scholars suggest that economists may overstate the leakage problem, at least in the initial stages in of

¹⁸ Thomas Wigley, Richard Richels & Jae Edmonds, *Economic and Environmental Choices in the Stabilization of Atmospheric CO₂ Concentrations*, 379 NATURE 240 (1996).

¹⁹ Michael Grubb, Jean-Claude Hourcade & M. Ha-Duong, *Influence of Socioeconomic Inertia and Uncertainty on Optimal CO₂ emission Abatement*, 390 NATURE 390, 270 (1997).

²⁰ INT. ENERGY AGENCY, WORLD ENERGY OUTLOOK (2004).

²¹ STERN, *supra* note 17, at 193.

²² Corfee-Morlot & Höhne, *supra* note 16, at 279.

²³ INT. ENERGY AGENCY, WORLD ENERGY OUTLOOK 2006 (2006). According to the IEA word-wide CO₂ emissions may increase 55 per cent by 2030 compared with 2005 levels, and China may surpass the United States as the largest emitter of CO₂ as early as 2010.

²⁴ BODANSKY, *supra* note 1, at 5.

international carbon policy.²⁵ Leakage can be reduced by an agreement with broad coverage and the assumption of core emission reduction and limitation commitments by all parties.

6.2.2 Cost-effectiveness

An important criteria for assessing climate proposals is their cost-effectiveness; the more cost-effective the approach the lower the cost of reducing emissions. This involves the least costly means of achieving a certain goal, for instance a particular concentration level of greenhouse gases. Cost effectiveness and efficiency are not the same – “[r]elying on cost-effectiveness as an assessment criterion can lead to the identification of a low-cost way of doing something that is fundamentally not sensible in economic terms.”²⁶ The distinction between cost-effectiveness and efficiency is important for reasons of policy analysis and law. Economic analysis of climate policy attempts to arrive at a socially optimal amount of mitigation, taking into account other needs, and using the tools of cost-benefit analysis. However, as we have seen in an earlier chapter such analysis is not without difficulties and is controversial in several respects.²⁷ Problems are experienced with respect to the rate used to discount future costs and benefits, as well as uncertainty relating to the costs of future mitigation costs.²⁸

While cost-benefit analysis is widely used in analyzing climate policy proposals, from a legal perspective the key point is that although the Convention refers to cost-effectiveness, it makes no reference to economic efficiency. In this regard, article 3(3) provides that the “Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change” and “taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.” It will be noted that cost-effectiveness is not self-standing, but acts here as a qualifier with respect to the text referring to a precautionary approach. To conclude, in legal terms the Convention states that the *achievement* of the stabilization objective shall be guided, among other things, by cost-effectiveness considerations. With respect to the definition of the objective itself, article 2 merely states that the stabilization level should be achieved “within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.” Although economic efficiency is likely to exert an influence on the (political) process of agreeing on a stabilization level, it is not an explicit principle or guideline under the Convention.

In many cases the industrial and power generation sectors of most developing countries are less energy efficient and use older, more polluting

²⁵ David G. Victor, *Fragmented carbon markets reluctant nations: Implications for the design of effective architectures*, in ARCHITECTURES FOR AGREEMENT: ADDRESSING GLOBAL CLIMATE CHANGE IN THE POST-KYOTO WORLD, 133, 135-36 (Joseph E. Aldy & Robert N. Stavins, ed., 2007).

²⁶ JOSEPH E. ALDY, SCOTT BARRETT & ROBERT N. STAVINS, RESOURCES FOR THE FUTURE, THIRTEEN PLUS ONE: A COMPARISON OF GLOBAL CLIMATE POLICY ARCHITECTURES 4 (2003).

²⁷ See chapter 4.

²⁸ Axel Michaelowa, Kristian Tangen & Henrik Hasselknippe, *Issues and Options for the post-2012 Climate Architecture- An Overview* 5(1) INTERNATIONAL ENVIRONMENTAL AGREEMENTS 5, 7 (2005).

technologies than their industrialized country counterparts. It follows that developing countries, particularly large ones, have considerable potential for cost-effective emission reductions. An approach based predominantly on cost-effectiveness grounds might conflict with equity and fairness. Approaches that allow for flexibility with respect to where emission reductions are carried out, through emissions trading, would tend to be less costly than more rigid approaches. This is recognized in article 3(3), which states “policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks...and comprise all economic sectors. The relative distribution of costs is also a key factor. If one party’s share of the costs (or benefits) exceeds that of another similarly situated party, then the fact that the agreement is overall less costly than an alternative will be of relatively little consequence.

6.2.3 Dynamic policy flexibility

Dynamic policy flexibility refers to commitments that can be adjusted – tightened or loosened – in response to new scientific insights and improved analysis of costs and benefits. With the many uncertainties in the timing and scope of impacts, as well as the costs and effectiveness of various responses to climate change, analysts, in particular economists, advocate a sequential process of decision-making that is able to respond to new information as it becomes available.²⁹ The concern is to ensure that resources are employed in the most productive manner, by for instance avoiding the premature retirement of expensive generation infrastructure in the quest to meet targets that are too stringent in the short term. To some degree policy flexibility is found in the climate regime, with the Protocol having established a first commitment period of five years, with the assumption that the second will be negotiated with regard to new scientific and economic information. On equity grounds it can be argued that because of the unequal bargaining positions of the parties a process built on frequent re-negotiation risks entrenching inequitable foundations.³⁰ In this view, it is important to secure equity principles from the outset.

6.2.4 Complementarity

In analyzing a scenario that foresees multiple instruments or approaches, complementarity of design would facilitate linkages among them.³¹ For instance, a decentralized, bottom-up approach with a range of mitigation measures at national and regional levels will be more effective if the various initiatives are open and capable of benefiting from inter-linkages, such as linking of regional emissions trading markets.³²

²⁹ ALDY ET AL, *supra* note 26, at 5.

³⁰ EDWARD A. PAGE, CLIMATE CHANGE, JUSTICE AND FUTURE GENERATIONS 177 (2006).

³¹ BODANSKY, *supra* note 1, at 5.

³² For arguments in favour of decentralized approaches see e.g. David G. Victor, Joshua C. House & Sarah Joy, *A Madisonian Approach to Climate Policy* 309 (5742) SCIENCE 1820 (2005); Taishi Sugiyama & Jonathan Sinton, *Orchestra of Treaties: A Future Climate Regime Scenario with Multiple Treaties among Like-minded Countries*, 5(1) INTERNATIONAL ENVIRONMENTAL AGREEMENTS 65 (2005); Kristian Tangen & Henrik Hasselknippe, *Converging Markets*, 5(1) INTERNATIONAL ENVIRONMENTAL AGREEMENTS, 47 (2005).

6.2.5 Continuity with UNFCCC and Kyoto Protocol

In political terms, many countries favor continuity with the institutions and approach of the Convention and the Protocol. The parties have invested considerable time and resources into these two instruments; on the other hand, the United States will probably never join the Protocol. Nonetheless, the flexibility mechanisms and carbon trading pioneered under the Protocol are widely regarded as building blocks for a future agreement. Similarly, the procedures for reporting and accounting greenhouse gas emissions will prove of great value for any future climate policy. Developing countries have a strong interest in retaining the mechanisms – meager as they are – that exist to support adaptation activities under the current system, foremost the Adaptation Fund.

On the downside, there exists the potential for policy “lock-in” - for instance, the switch from an approach based on targets to one based on policies, which could be more acceptable to developing countries, has become more difficult. Scholars with very different positions on the optimal international climate change “architecture” underline the importance of frameworks that can accommodate different policies – international emissions trading, sectoral policies, intensity measures and technology-driven approaches.³³ Certainly, an approach based on quantified emission targets favors industrialized countries with stable populations and sophisticated economies. Countries with growing populations and less advanced economies – or more rapid economic growth, such as the United States - are more likely to see the current target-based system as a threat to their socio-economic development. In sum, quantified emission limitation and reduction commitments, the heart of the Kyoto Protocol, will probably remain unacceptable to developing countries for some time to come, so that initial commitments by this category of countries would need to take a different form. Instead, mitigation action by developing countries will in the first instance consist of slowing, and eventually halting, the rate at which their emissions are rising, with funding and access to technology playing an important role.³⁴

6.2.6 Compatibility with development goals

Compatibility with development goals and consideration of national circumstances will be particularly important in the next phase, which will need to broaden the circle of parties undertaking mitigation commitments. Developing countries regard poverty eradication as their primary objective,³⁵ with the result that they will be more likely to support climate policies that advance, rather than restrict, the goals of economic and social development, for instance the achievement of the

³³ For an excellent summary of the various models, by leading proponents, see ARCHITECTURES FOR AGREEMENT: ADDRESSING GLOBAL CLIMATE CHANGE IN THE POST-KYOTO WORLD, (Joseph E. Aldy & Robert N. Stavins, ed., 2007).

³⁴ See Bali Action Plan adopted at the 13th Session of the Conference of the Parties (COP-13), held from 3-15 December 2007, refers to “Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development *supported and enabled by technology, financing and capacity-building in a measurable, reportable and verifiable manner...*” para. 1(b)(ii), (emphasis added).

³⁵ Delhi Ministerial Declaration on Climate Change and Sustainable Development, adopted at the 8th Session of the Conference of the Parties (COP-8), 23 October to 1 November 2002.

Millennium Development Goals (MDGs).³⁶ This implies an approach that addresses climate change in the context of sustainable development, as opposed to viewing it predominantly as an environmental problem. Specifically, rather than adopting climate policies for their own sake, developing countries are likely adopt cleaner energy technologies because they reduce local air pollution, improve energy security by substituting for imported fuels, and reduce costs through greater efficiency. Mitigation is a co-benefit of these policies. The climate benefits are useful “co-benefits” but would not constitute the primary driver for the relevant policies and technologies. Some observers warn that climate change policy should not be linked too closely to efforts to solve broader development problems.³⁷ While it may be correct to point out climate policy should not be held hostage to progress on international development issues, such as trade or development assistance policies, it remains true that the nature of global development – population growth, economic development, and technological change – determines long-term future emissions profiles.³⁸

Adaptation to the impacts of climate change is of particular concern in the context of development. Policy proposals would also need to balance the effort and resources channeled to mitigation with those devoted to adaptation to the impacts of climate change. For instance, a decentralized, bottom-up approach, with its focus on national and regional action, may not adequately address the adaptation needs of poor and vulnerable countries.

6.2.7 Simplicity and predictability

Simplicity and predictability are important yardsticks for any international agreement. Proposals with complex formulas are more difficult to convey and understand, and for that reason probably less likely to garner broad agreement. It is therefore possible that negotiators may prefer policies that are sub-optimal in terms of cost-effectiveness or another important criterion, over environmentally and economically sounder, but more complex proposals. Some countries may also favor approaches that provide economic predictability with respect to the costs of implementation.³⁹

6.2.8 Broad participation

A fairly widely held view is that a climate regime with broad participation delivers the most benefits.⁴⁰ The depth of parties’ commitments, especially those shouldered by major emitters, however, will also determine the strength of the regime. An agreement with shallow commitments may secure broad participation and full compliance, but could fall short with respect to effective mitigation. An alternative is a “narrow-but-deep” agreement that results in sizeable mitigation

³⁶ Jiahua Pan, *Commitment to Human Development Goals with Low Emissions: An Alternative to Emissions Caps for Post-Kyoto from a Developing Country Perspective*, 5(1) INTERNATIONAL ENVIRONMENTAL AGREEMENTS 89 (2005).

³⁷ PHILIBERT, *supra* note 5.

³⁸ IPCC, SPECIAL REPORT: EMISSIONS SCENARIOS, SUMMARY FOR POLICYMAKERS 5 (2000).

³⁹ BODANSKY, *supra* note 1, at 6.

⁴⁰ See ALDY ET AL, *supra* note 26. See also COSBEY ET AL, *supra* note 2, at 8. For an opposing view see Victor, *supra* note 25, at 133.

among a limited group of large emitters. Such an approach might also circumvent that the cumbersome process of securing agreement among a very large number of parties. However, a broader but shallow agreement, with less mitigation per country but almost full participation, has the advantage of greater efficiency because, via emissions trading, it lowers overall costs.⁴¹ In addition, such an approach also reduces the incentive for firms to relocate emissions-intensive activities from areas with emissions controls to regions that are not subject to restrictions. Over time, broadening of effective controls on GHG emissions in all regions could initially be contingent on, and be driven by, a combination of incentives for mitigation measures and access to cleaner technologies.

6.2.9 Long-term target and technological innovation

An agreement with a long-term target could stimulate technological innovation and enhance cost-effectiveness, as firms and individuals can make decisions with greater certainty about the costs and benefits associated with investments. For instance, achieving the European Union's target of a maximum rise of 2 degrees Celsius above pre-industrial temperatures can, subject to uncertainties, be roughly related to a range of GHG concentrations. This can provide an idea of the expected level of ambition in terms of mitigation action required. As the science remains uncertain on how the climate system will respond to rising GHG emissions, any framework should make provision for relaxing or tightening the policy in response to new information. Overall, a long-term time horizon may allow a more comprehensive and efficient response to the climate change problem; on the other hand, a long timeframe may invite delay and procrastination. Some observers therefore argue that targets should be set over periods somewhat longer than the five-year commitment period of the Kyoto Protocol, but beginning with only moderate effort and becoming more stringent over time.⁴²

Climate and energy policies should provide incentives to induce technological change. On the one hand, public funding for basic and applied energy research can compensate for under-investment by the private sector in research and development, which has been identified as a classic market failure.⁴³ Alarmingly, indications are that public and private sector energy research and development has been declining.⁴⁴ On the other hand, putting a price on the emission of greenhouse gas emissions, either by means of a cap-and-trade scheme or a carbon tax, should also drive firms to innovate in developing less carbon-intensive technologies and products. However, even a fairly high carbon price in cap-and-trade scheme may not be sufficient to spur

⁴¹ ALDY ET AL, *supra* note 26, at 6.

⁴² Sheila M. Olmstead & Robert M. Stavins, *An International Policy Architecture for the Post-Kyoto Era* 96(2) AMERICAN ECONOMIC REVIEW PAPERS AND PROCEEDINGS 35, 36 (2006). They describe the Kyoto targets as "too little, too fast".

⁴³ Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS, 609-625 (Richard R. Nelson, ed., 1962). Because an individual firm does not reap the full reward of its investment in R&D – other firms stand to benefit too by adopting the new invention or process, but at little or no cost – it is economically rational to under-invest in such activities.

⁴⁴ Daniel F. Kammen & Gregory F. Nemet, *Real Numbers: Reversing the Incredible Shrinking Energy R&D Budget*, ISSUES IN SCIENCE AND TECHNOLOGY 84 (2005).

the necessary changes in the development of clean energy technologies.⁴⁵ This underlines the importance of complementary policy measures, such as the promotion of energy efficiency and renewable energy, which are being adopted at the state level in the United States, in the absence of concerted federal climate policy.⁴⁶ Evidence from the first phase of the EU Emissions Trading Scheme suggests that because allowance prices were too low to make up for the price difference between coal and natural gas, utilities by and large did not switch from coal to less carbon-intensive natural gas.⁴⁷ Moreover, in many cases power producers were able to pass higher costs on to consumers.

The absence of any provisions to stimulate research and development in cleaner energy technologies and systems has been identified as a failing of the Kyoto Protocol.⁴⁸ Some of the proposals a future climate regime propose separate agreements on technology,⁴⁹ while others rely entirely on setting technology standards in order ensure wider participation and compliance.⁵⁰ Proponents of a technology standards approach acknowledge the risks of locking in particular technologies and higher costs compared with market-based policies, but they also counter that technology standards are more likely to be successfully implemented than a cap-and-trade system.⁵¹ In some cases information and other barriers are significant – energy efficiency of consumer goods, such as air-conditioners – mandating standards is simply more effective than any conceivable market-based solution, which would rely on individual responses market signals, such as higher electricity prices. This realization seems to be behind the decision in several jurisdictions to phase-out inefficient incandescent light bulbs;⁵² despite their

⁴⁵ Michaelowa et al, *supra* note 28, at 17. For an overview of why emissions trading may result in marginal technology adoption, but not innovation with respect to zero-emission technologies, see William Pizer, *Practical global climate policy*, in ARCHITECTURES FOR AGREEMENT: ADDRESSING GLOBAL CLIMATE CHANGE IN THE POST-KYOTO WORLD, 280, 292-3 (Joseph E. Aldy & Robert N. Stavins, ed., 2007).

⁴⁶ Michael Northrop & David Sassoon, *Cap and trade and more*, ENVIRONMENTAL FINANCE, June 2007, at 3.

⁴⁷ Trevor Sikorsky, *The EU Emissions Trading Scheme: Principles and Challenges in Implementation*, March 2007, presentation at Imperial College London, on Climate Change: Science, Impacts and Responses (copy on file with author).

⁴⁸ Daniel Sarewitz & Roger Pielke, Jr., *The Steps Not Yet Taken*, in 2 CONTROVERSIES IN SCIENCE AND TECHNOLOGY: FROM CLIMATE TO CHROMOSOMES (Daniel Lee Kleinman, et al, eds., 2008).

⁴⁹ See Sugiyama & Sinton, *supra* note 32, at 65. As one part of a trio of agreements Sugiyama and Sinton propose a Zero Emission Technology Treaty designed to foster long-term technological change.

⁵⁰ SCOTT BARRETT, ENVIRONMENT AND STATECRAFT: THE STRATEGY OF ENVIRONMENTAL TREATY-MAKING (2003); Scott Barrett & Robert N. Stavins, *Increasing Participation and Compliance in International Climate Change Agreements*, 3 INTERNATIONAL ENVIRONMENTAL AGREEMENTS: POLITICS, LAW AND ECONOMICS 349, 366-369 (2003).

⁵¹ Barrett & Stavins, *supra* note 50, at 369. Barrett and Stevens cite the example of the 1973 International Convention for the Prevention of Pollution from Ships (MARPOL), which required the adoption of segregated ballast tanks for oil tankers and proved more effective than previous efforts to limit oil pollution. It should also be noted that technology standards could be subject to regular adjustment and evaluation, in an effort to maximize cost-effectiveness.

⁵² Tim Johnston, *Australia is Seeking Nationwide Shift to Energy-Saving Light Bulbs*, N.Y. TIMES, February 22, 2007, <http://www.nytimes.com/2007/02/21/business/worldbusiness/21light.html>. Claudia H. Deutsch, *No Joke, Bulb Change is a Challenge for U.S.*, N.Y. TIMES, December 22, 2007,

demonstrated energy-saving potential, the market share of compact fluorescent light bulbs has remained fairly low.

Finally, a proposal must be evaluated against prevailing political and institutional realities. Proposals must achieve a balance of environmental effectiveness, equity and cost-effectiveness. The demands they place on the institutions at the national and international level should not exceed what is reasonable. Policies that are relatively easier to implement – for instance, do not involve the establishment of new international institutions – and that can be monitored easily will be at an advantage.

6.3 International climate policy - proposals

The next section discusses and assesses a number of proposals for a future international climate policy. Representative proposals are briefly outlined and then assessed in accordance with policy and equity criteria.

6.3.1 Contraction and convergence

The “Contraction and Convergence” proposal, developed by the Global Commons Institute, assigns each individual an equal entitlement to greenhouse gas emissions, based on an overall global carbon budget.⁵³ Stabilization of atmospheric concentrations of GHGs will require the contraction of emissions over time. This model holds that as emissions contract, they should also converge on a single per capita figure. Negotiations would determine the per capita convergence value, the path to convergence, and the timing. The convergence value would be considerably below current per capita emissions, which would have to be cut dramatically, while developing country emissions could grow for some time, allowing for economic and social development, before also falling to the convergence value. Trading mechanisms would be used, so that industrialized countries could purchase the necessary entitlements while they shift to a low-carbon economy.

Assessed against the selected equity principles, the contraction and convergence model scores very well. Supported by the fundamental notion of equality, it possesses a simplicity and intuitive appeal that is easily conveyed. Since we accept equality as a bedrock principle in other areas of human affairs – equal treatment for women and minorities, human rights – it seems plausible to apply the same logic to entitlements to “atmospheric space”. The model also addresses, or does not conflict with, the responsibility, needs and capability dimensions of equity and fairness in climate change.⁵⁴ With respect to needs and capacity, contraction and

<http://www.nytimes.com/2007/12/22/business/22light.html>. The Energy Independence and Security Act of 2007, section 322, sets standards banning the current generation of inefficient incandescent light bulbs by 2012.

⁵³ The model is described on the Global Commons Institute website, <http://www.gci.org.uk/>. For a recent application of the principles of contraction and convergence, see TOM ATHANASIOU & PAUL BAER DEAD HEAT, GLOBAL JUSTICE AND GLOBAL WARMING (2002), especially at 76-97.

⁵⁴ But cf. Michel den Elzen et al, *Multi-Stage: A Rule-Based Evolution of Future Commitments Under the Climate Change Convention*, 6(1) INTERNATIONAL ENVIRONMENTAL AGREEMENTS 1, 21 (2006), citing as one of the cons of the contraction and convergence approach that it “[t]akes no account of other equity principles (capacity, responsibility for historical emissions).” Strictly speaking this may be true, but this alone is not sufficient to show that in the climate change context there is an actual conflict between contraction and convergence and the other principles.

convergence allows developing countries to divert their resources primarily to poverty eradication and economic development, and concentrating on mitigation activities when they have acquired the requisite economic and technical capabilities, a process that could be assisted by the access to funding and clean technologies from developed countries. And the onus to cut emissions would be on the nations with the greatest historic responsibility for accumulated emissions, as well as the technological and financial resources to carry out mitigation activities.

Critics argue that there is no compelling reason why the right to emit should be equally shared when the same does not hold true for other public goods.⁵⁵ They contend that contraction and convergence rests on “a contestable ideological choice”.⁵⁶ It is true that proponents recognize – and in fact advocate – the redistributive effect of contraction and convergence, which it is argued combat climate change and promote fairer world-wide economic development.⁵⁷ The earlier discussion of equality noted that the strict application of the principle could have undesirable effects, including “leveling down” and the lack of sensitivity to individual differences.⁵⁸ The possibility that implementation of contraction and convergence would result in dragging citizens of all states down to the same or similar level of economic well-being is not plausible. First, since all countries would have to agree on the global stabilization target, from which the convergence values are then calculated, they can influence the stringency, and the overall hence cost. Second, industrialized countries would achieve the necessary cuts with the aid of trading, among themselves and with developing countries. While the trading of emissions allowances between industrialized and developing countries would result in large resource transfers from the former to the latter, the overall outcome would be efficient, in accordance with the Coase theorem.⁵⁹ Faced with the need to undertake very deep cuts in their emissions, at high and increasing cost, industrialized countries would purchase emission allowances from developing countries, whose per capita emissions would still be below the agreed global value. However, it is true that the model would need to be adjusted to account for the specific circumstances of particular regions or countries, for instance those in cold regions, where space-heating needs are higher. Such countries would be entitled to an upwards adjustment in their allocation of emission allowances, commensurate with their demonstrated special circumstances. Reference is sometimes also made to the perverse incentive that contraction and convergence could have with respect population growth. Given the many drivers of influencing population growth, it seems rather far-fetched that climate policy would

⁵⁵ John Ashton & Xueman Wang, *Equity and Climate: In Principle and Practice*, in BEYOND KYOTO: ADVANCING THE INTERNATIONAL EFFORT AGAINST CLIMATE CHANGE 61, 69 (Pew Center for Global Climate Change, 2003).

⁵⁶ *Id.* at 69.

⁵⁷ See ATHANASIOU & BAER, *supra* note 53.

⁵⁸ See chapter 4.

⁵⁹ In its basic form the Theorem holds that with the possibility of trading and absent transaction costs, the initial distribution of property rights (entitlements) does not affect the efficiency of the outcome. In other words, the possibility of trading means that an efficient outcome is always possible, no matter how the emission allowances are initially allocated. The cost reductions achieved through global emissions trading are well established in the literature, see John P. Weyant & Jennifer Hill, *Introduction and Overview*, THE COSTS OF THE KYOTO PROTOCOL: A MULTI-MODEL EVALUATION, SPECIAL ISSUE OF THE ENERGY JOURNAL vii, (John P. Weyant ed., 1999).

have a significant impact. In any event, putting the model into practice would require selecting a population reference period or periods, which could be calculated so as to account for any perverse incentive.

Contraction and convergence begins with an overall target, according to a global emissions budget is calculated. Provided the target is sufficiently stringent, the approach will provide environmental effectiveness. In addition, compared to approaches relying on multiple stages, contraction and convergence is conceptually simple and predictable. In fact, as in essence a guiding umbrella principle, it leaves the choice of tools to achieve emission reductions open to the parties. However, it represents a radical departure from Kyoto model, which is built on grandfathered emission entitlements, and would thus require a new approach. In particular, since the definition of per capita convergence values requires a stabilization level, agreement on this point would be required. Agreement on a long-term goal would likely prove challenging for the political process. On the other hand, once the global stabilization target was agreed, the parties could use the mechanisms of the Kyoto Protocol, especially emissions trading, as countries with low per capita emissions could sell a portion of their “excess” emission allowances. In the end, the biggest obstacle to contraction and convergence is political acceptability – high per capita countries are at present not prepared to endorse the re-distribution of resources to low per capita countries that would follow from its implementation. This is unlikely to change in the near term.⁶⁰

One issue that may arise in the implementation of the proposal concerns the difficulty developing countries, especially the poorest, may experience in establishing the necessary institutional and technical capacity for emissions trading.⁶¹ Moreover, there exists the possibility that governments of developing countries might sell off so much of their stock of entitlements, leaving the next generation without reserves when their emissions reach or exceed the per capita convergence value. What is to stop a government selling entitlements, for short-term gain, without regard to the future? It could be argued that it makes sense to sell as many entitlements as possible early on, in order to develop, on the basis that in decades to come a wealthier and technologically advanced society will be capable of making the necessary emission cuts to meet the convergence target. Such decisions involve highly uncertain assumptions about future economic growth and rates of technological change. Many developing countries are poorly equipped to undertake these kinds of analyses. Possible responses to the potential danger of over-selling could include delayed or staggered vesting procedures, the need to maintain a periodically adjusted reserve margin and oversight by an international institution. Countries may regard some of these options as infringing their sovereignty.

If the prospect for a straightforward implementation of contraction and convergence remain slim, it is also likely that elements of this model will be present

⁶⁰ The German Chancellor, Angela Merkel, has proposed the long-term goal of converging emissions. See *Chancellor Angela Merkel launches a new climate initiative*, English language homepage of the Chancellor, 30 August 2007, http://www.bundestkanzlerin.de/Content/EN/Artikel/2007/08/2007-08-30-bundestkanzlerin-in-japan_en.html. The Associated Press, *Merkel calls for global emissions trading agreement to follow Kyoto*, INTERNATIONAL HERALD TRIBUNE, October 9, 2007, <http://www.ihrt.com/articles/ap/2007/10/09/europe/EU-GEN-Germany-Climate-Conference.php>

⁶¹ den Elzen et al, *supra* note 54, at 20.

in any long-term solution. Simply put, in order to arrive at a stabilization target consistent with the scientific findings requires some convergence of per capita emissions – neither a continuation of business as usual in the developed economies, nor an untrammelled rise in developing country emissions is remotely compatible with low or middle-level stabilization levels. Given its appeal to the universal ideal of equality, the contraction and convergence is uniquely qualified to remind all participants of the equity dimension of climate change.⁶²

6.3.2 Brazilian proposal

The proposal, originally made by Brazil in the Kyoto negotiations, is based on historical responsibility for temperature change.⁶³ Entitlements are assigned based on historical responsibility, calculated in accordance with a climate model agreed on by the parties.⁶⁴ The proposal was originally intended to apply only for purposes of differentiation among industrialized countries, but the methodology could be expanded to encompass all countries.⁶⁵ And while the original proposal counts responsibility for emissions from the Industrial Revolution, it is also possible to estimate historical responsibility over more recent periods. For reference, according to recent research, the average contributions to the global mean surface temperature increase in 2000 are around 40 per cent from OECD group of industrialized countries, 14 per cent from Eastern Europe and the former Soviet Union, 24 per cent from Asia, and about 6 and 16 per cent respectively from Africa and Latin America.⁶⁶ The choice of methodology and the greenhouse gases covered may have considerable implications for attributed responsibility.⁶⁷ For instance, including only the fossil CO₂ emissions and not emissions from land-use change (deforestation) increases the contribution of the OECD group of countries by 21 percentage points and decreases the contribution of Asia by 14 percentage points.⁶⁸

For the simple reason that climate change is a cumulative process – historical emissions are relevant as matter of pure physics, not legal construct – it would be incorrect to regard the historical responsibility approach as giving large developing countries a “free pass”. The warming to date is partially a consequence of fossil fuels combusted one-hundred years ago. Historical responsibility is a plausible and defensible – if not compelling – criterion for distributing the effort of dealing with a global problem. Moreover, as countries industrialize, their cumulative emissions, and hence their responsibility, will increase.

⁶² Ashton & Wang, *supra* note 55, at 69.

⁶³ U.N. Doc. FCCC /AGBM/1997/MISC.1/Add.3, 3. The proposal remains on the agenda of the Conference of the Parties to the Convention whose Subsidiary Body for Technological and Scientific Advice (SBSTA) has sponsored continued research into contributions to climate change. See U.N. Doc. [FCCC/SBSTA/2002/INF.14](#) for a summary of the research efforts carried out by various institutions, while up-to-date information is available at <http://www.match-info.net/>

⁶⁴ BODANSKY, *supra* note 1, at 22.

⁶⁵ Michel den Elzen & Michiel Schaeffer, *Responsibility for past and future global warming: Uncertainties on attributing anthropogenic climate change* 54 CLIMATIC CHANGE, 29 (2002).

⁶⁶ Michel den Elzen et al, *Analysing countries' contributions to climate change: scientific and policy-related choices*, 8 (6) ENVIRONMENTAL SCIENCE & POLICY, 614 (2005).

⁶⁷ den Elzen & Schaeffer, *supra* note 65, at 71-72. Of the methodological choices, including CO₂ emissions from land-use has and non- CO₂ gases have the greatest impact on outcomes.

⁶⁸ den Elzen et al, *supra* note 66, at 614.

The responsibility approach taps an intuitive sense that those who have caused harm – in this case, emitted the largest stock of GHGs - should also bear the primary responsibility for abatement.⁶⁹ It may also be loosely, if perhaps inaccurately, equated with the “polluter pays” principle. A responsibility approach is compatible with the need and capability principles, as the responsible parties are also the wealthiest and possess the technological capacity to spearhead the response to climate change.⁷⁰ Overall, a responsibility approach would not necessarily conflict with the application of the equality principle, as in the contraction and convergence proposal. An exception might be countries with historically high emission burdens, continued reliance on fossil-fuel intensive economies, and small populations, for instance certain countries of the former Soviet Union.

Measured against a number of policy assessment criteria the responsibility approach does not fare that well. Although the basic concept is straightforward, uncertainties regarding non-fossil fuel emissions and related methodological issues mean that putting it into practice will more complex. Environmental effectiveness would depend on the target that is set independently; the responsibility criterion comes into play in allocating the burden among the parties. This option is compatible with the approach of the Convention and the Kyoto Protocol, and since it relies on quantified emission targets it would not accommodate alternatives such as growth (intensity) targets. Among the disadvantages of the responsibility approach are that it is not very sensitive to country-specific circumstances. Where the proposal is applied to a limited number of countries, cost-effectiveness may be an issue, unless trading can be expanded through instruments such as the clean development mechanism (CDM). Although a responsibility model can be adjusted to account for new scientific and economic information, it is less flexible than some other proposals.

6.3.3 Multi-stage and graduation and deepening

The multi-stage and graduation and deepening are two proposals for involving developing countries in a future climate change agreement.⁷¹ They are representative of a set of “top-down” burden-sharing proposals, and since they share a number of common features it is convenient to discuss them together. Under the multi-stage approach developing countries assume progressively more stringent commitments, with passage from one stage to the next determined by a variety of criteria. (The very poorest countries, lacking in technical and economic capacity, would not be expected to assume targets, but would benefit from technical and financial assistance designed to steer them towards a low-carbon development path.)

⁶⁹ In the same way that a polluter is assessed responsibility for the total discharge, the fact that annual GHG emissions of, for instance, China may rival and soon surpass that of the U.S. is not directly relevant – at issue here is the responsibility for a share of the total stock over time.

⁷⁰ See CICERO & CCN, SHARING THE BURDEN OF GREENHOUSE GAS MITIGATION, *supra* note 4, at 54. The study assigns the Brazilian proposal a high equity score on need, capacity and “guilt”, but very low on potential for operational implementation.

⁷¹ See BODANSKY, *supra* note 1, at 36, 47; Michel den Elzen & Marcel Berk, *Options for Differentiation of Future Commitments in Climate Policy: How to Realize Timely Participation to Meet Stringent Climate Goals?*, 1(4) CLIMATE POLICY 465 (2001); Axel Michaelowa, Sonja Butzengeiger & Martina Jung, *Graduation and Deepening: An Ambitious Post-2012 Climate Policy Scenario*, 5(1) INTERNATIONAL ENVIRONMENTAL AGREEMENTS 25 (2005).

Several versions of the multi-stage proposals exist, but an up-to-date iteration sees developing differentiated according to the following three distinct stages: stage one, no quantitative limits and the emissions path is not subject to controls; stage two, countries assume intensity targets or a prescribed deceleration in emissions growth; and stage three, countries would be subject to quantified emission reduction targets.⁷² All Annex 1 parties are assumed to be at stage three; developing countries make the transition (graduate) to stage two on the basis of an index made up of per capita GDP (reflecting the capability to act) and per capita CO₂ equivalent emissions (reflecting responsibility for climate change). This is termed the capacity-responsibility index. Earlier versions used only a per capita income measure for differentiation.⁷³ The inclusion of per capita emissions results in the earlier inclusion of low-income countries, particularly those with relatively high per capita emissions, such as South Africa. Transition to stage three is based on a more stringent version of the capacity-responsibility index; alternatively the threshold is calculated as a proportion of world average per capita emissions. The choice of an overall stabilization target determines the formulation of the “thresholds” for graduation – a more stringent global target would mean that advanced developing countries “graduate” more quickly to emission controls. At stage three, the emission reduction burden-sharing is in accordance with per capita emissions. Although not always explicit, the elaboration and implementation of the scheme would presumably be left to the existing international structures, in other words the UN Framework Convention on Climate Change.

The multi-stage proposal discussed here makes a conscious attempt to incorporate equity and fairness. The graduation criteria reflect the equity principles of need, capability and responsibility. Equality is reflected in the choice of per capita emissions as the burden-sharing criteria in the final stage.⁷⁴ On a more practical note, this proposal is flexible and could be adjusted to differing national circumstances and is compatible with the architecture of the Convention and Kyoto Protocol. Cost-effectiveness is advanced through the use of emissions trading in the final stage, as well as through continuation of the clean development mechanism, enabling countries in stage three to invest in emission reduction projects in countries that have not yet assumed quantified emission reduction commitments.

The use of intensity targets in stage two may give rise to some concerns about environmental integrity.⁷⁵ Like other top-down proposals discussed so far, this one also requires the fixing of an explicit long-term target. Finally, implementation of the proposal would face a political hurdle because it implies dismantling the common front of the G-77 and China developing country negotiating group. It appears that sufficient flexibility exists to ameliorate many concerns, for instance by ensuring that adaptation to climate change – a major concern for island states and African countries – receives adequate resources under a new climate regime.

The graduation and deepening proposal is similar to multi-stage in several respects: transition for developing countries, in this case directly to Kyoto-style quantified emission reductions, is on the basis of a graduation index (GI) consisting

⁷² den Elzen et al, *supra* note 54, at 4-5.

⁷³ den Elzen & Berk, *supra* note 71, at 465.

⁷⁴ den Elzen et al, *supra* note 54, at 22.

⁷⁵ *Id.* at 22.

of GDP and emissions per capita measures.⁷⁶ In the multi-stage model the graduation threshold is a function of the agreed stabilization target. In the graduation and deepening scenario 550 ppm is assumed as the stabilization target, with agreement that emissions should peak no later than 2030. The overall stringency of the country targets – which are summarized below – is based on this stabilization goal. Arguably this approach lacks ambition – at the Thirteenth Conference of the Parties to the UNFCCC (COP-13), the European Union took the position that global GHG emissions should peak within the next ten to fifteen years and that Annex 1 countries as a group would need to cut their emissions by 25-40 per cent by 2020.⁷⁷

The chosen baseline year is 2012, and there are three levels of emission targets: a six per cent reduction, a three per cent reduction and stabilization at the level of the baseline. Countries classified by the United Nations as least-developed countries (LDCs), receiving assistance under the International Development Association (IDA) arm of the World Bank, or food aid recipients are exempted from any targets. The GI of all countries is calculated. Differentiation then takes place as follows: developing countries with a GI higher than the Annex B average take on the most stringent reduction target, in other words 6 per cent.⁷⁸ In this list would be Singapore, which is nominally still a developing country, as well as oil exporting countries with high per capita incomes and emissions, such as Qatar and the United Arab Emirates. Second, developing countries with a GI above that of the lowest Annex II (highly industrialized) countries are subject to the three per cent reduction. Countries falling into this group include the Republic of Korea and Saudi Arabia. Third, countries with a GI above that of the lowest Annex B country assume a stabilization target. Finally, countries that do not pass the lowest threshold of the graduation index – among which are China, India and Indonesia – and emit more than 50 million tons of CO₂ can assume a intensity target with trading or participate in a project-based measure like CDM.

The composition of the graduation index reflects two important equity principles – capability (GDP per capita) and responsibility (emissions per capita). Naturally the proof of any such indexes lies in the application of the relevant thresholds, which in this case are reasonably easy to comprehend, leading to groupings that seem “fair” in differentiating the group of developing countries. Managing and implementing the scheme – presumably the task of the intergovernmental climate negotiations – could prove to be altogether more difficult. The exemption of countries on the lowest rung of the development ladder – which would include most of sub-Saharan Africa – is a welcome recognition of the principle of need. The group of oil exporting countries with relatively high incomes and very high per capita emissions would not find that this scheme takes account of their national circumstances; it is likely to prove difficult to secure their participation, although the possibility of inexpensive emission reduction opportunities, and

⁷⁶ Michaelowa et al, *supra* note 71, at 31-33.

⁷⁷ *Summary of the Thirteenth Conference of the Parties to the UNFCCC and the Third Meeting of the Parties of the Kyoto Protocol, 3-15 December, 12(354) EARTH NEGOTIATIONS BULLETIN, 18 December, <http://www.iisd.ca/dimate/cop13/>.*

⁷⁸ Annex B of the Kyoto Protocol lists the countries subject to emission limitation and reduction commitments.

therefore emissions trading, could serve as a carrot. While the proposal is no more complex than comparable schemes, developing countries might consider the emission reductions arbitrary – those developing nations with the most stringent targets would argue that it would be more equitable to lower their targets, perhaps from six to five per cent, with a commensurate increase for the group with lower targets. This gets to the point that each set of developing countries– for instance the six per cent group – encompasses parties with rather different economic structures, such as Qatar and Singapore, with varying abatement costs. The immediate imposition of an absolute emission reduction target would constitute a blunt instrument; equity and fairness point in the direction of a more gradual transition and a wider choice of instruments, such as intensity or sectoral targets.

6.3.4 Orchestra of treaties and converging markets

The orchestra of treaties and converging markets proposals are examples of decentralized, bottom-up approaches.⁷⁹ Based on the conviction that Kyoto-style targets give rise to adversarial negotiating stances, the orchestra of treaties aims for a more facilitative approach by: taking account of sovereignty concerns related to energy policies; building on national interests in the areas of technology and economic development; addressing long-term technological change, not only short-term emission cuts.⁸⁰ The proposal consists of four building blocks, three of which develop outside the ambit of the Convention. One, a group of emission markets (GEM) is developed, based on a gradual coordination of domestic emission markets, which takes place in the absence of internationally agreed targets. This scenario would feature an evolutionary, “bottom up” process of coordination and linking of various domestic cap-and-trade schemes. Two, a Zero Emission Technology Treaty (ZETT), which has its ultimate goal zero CO₂ emissions from the energy sector, is intended to address long-term technological change, but does so without infringing sovereignty because it operates on the basis of a voluntary pledge and review basis. A third component would be a climate-wise development treaty (CDT) to promote development, technology transfer and adaptation. Finally, UNFCCC would serve as political forum and opportunity for information exchange and funding mechanism. The ZETT and CDT would presumably be the result of centralized negotiations under the auspices of the UNFCCC. A key issue under the CDT would be the need to secure funding for technology transfer and other activities designed to assist developing countries.

The converging markets proposal is essentially an elaboration of one block – the group of emission markets – of the orchestra of treaties model. It would proceed through the integration of currently fragmented domestic trading systems. In order to be admitted to the core group, countries would have to assume mandatory national targets, and candidate countries could receive financial assistance to prepare them for entry into the system. There would be no central allocation, burden-sharing formulas or formally agreed stabilization target, but instead national emission targets would be developed on a country-by-country basis. It would be possible to (re)integrate the scheme under the umbrella of the

⁷⁹ Sugiyama & Sinton, *supra* note 32, at 65; Tangen & Hasselknippe, *supra* note 32 at 47; BODANSKY, *supra* note 1 at 26, 48.

⁸⁰ Sugiyama & Sinton, *supra* note 32, at 65.

Framework Convention. Once a country has established a trading scheme with mandatory targets, the incentive to link with the larger market group comes from reduced abatement costs. The same is true for members of the group as a whole – expansion of the market will tend to lower the marginal costs of abatement. There is no conceptual reason standing in the way of linking and integration of various domestic markets, provided that certain design elements, such as permit allocation rules, are properly designed.⁸¹ Overall a functioning market would benefit from clear rules and some degree of harmonization. Corporations with from sectors with high emissions and globe-spanning operations can be expected to be advocates of harmonization, preferring greater uniformity to a patchwork system of markets. Unlike the Kyoto Protocol, where rules are made by the parties and implemented with the assistance of a central bureaucracy, the converging markets approach would rely on market-to-market coordination and cooperation.

Unlike the other proposals examined so far, the orchestra of treaties model does not consciously reflect any equity principles. The group of emission markets (GEM), as further detailed in the convergence of markets variant, would expand in accordance with market logic – lowest cost emissions reductions – and on terms reflecting the bargaining power of the parties. Depending on its structure, the GEM would probably roughly reflect the principles of responsibility and capability; that is not to say that major industrialized country emitters may elect not to undertake any emission reductions, or otherwise only very shallow ones. However, the fact that a number of developing countries would be obliged to assume the most stringent form of targets could be perceived as offending against the principle of responsibility. Such countries might argue that their national circumstances – for instance Qatar, an oil exporting country with a small population – should serve to differentiate them from countries with much greater historical responsibility. Due to both a lack of emission reduction opportunities, which are generally correlated with industrial activity, as well as inadequate institutional frameworks, least-developed countries are unlikely to benefit from emissions trading. A decentralized system is less likely to respect the principle of need; in particular, least-developed countries will have even less of a forum to press for inclusivity, consideration of their vulnerability and funds dedicated to adaptation needs.

The orchestra of treaties proposal relies on bottom-up organization coupled with a minimum of top-down coordination, of a kind that entails minimal impact on sovereignty. The environmental effectiveness of the approach is uncertain, and no overall stabilization target is established. However, the Zero Emission Technology Treaty (ZETT) addresses the domain of clean energy technology development, deployment and diffusions, a critical area that is not integrated into the climate regime as it stands. It also corresponds to the approach championed by the United States, as well rapidly industrializing countries that regard access to technology as critical for development and climate goals. The broader the participation in the group of emission markets (GEM), the lower the cost of mitigation is likely to be. A more decentralized approach will probably entail higher transaction and coordination costs, as more time and resources would need to be spent on ensuring compatibility between systems with different characteristics. Being decentralized, the approach is

⁸¹ See JANE ELLIS & DENNIS TIRPAK, OECD/IEA, LINKING GHG EMISSION TRADING SCHEMES AND MARKETS (2006).

very flexible, and its essentially voluntary nature allows countries to define their degree of participation in accordance with national circumstances. The climate-wise development treaty (CDT) responds to the growing understanding that climate change concerns ought to be integrated into development policies, and that for developing countries climate mitigation will often be the co-benefit of policies aimed at greater energy security, improved energy efficiency, and reduced air pollution. One of the obstacles faced by this approach is the free-rider problem; some countries may forge ahead, others may be content to do nothing, but without collective action individual efforts will have little effect. In short, there may not be sufficient glue to bind the blocks together into an effective response to climate change, with result that emission cuts are inadequate. Nonetheless, the orchestra of treaties proposal highlights a number of themes - technology, climate in the context of development concerns, and the potential for leadership among smaller groups of countries – that address possible shortcomings in the Kyoto Protocol and which coming to the fore in discussions on future of the climate regime.

6.3.5 Global Triptych

The global triptych is a bottom-up, sector-based and technology-oriented proposal for differentiating commitments. The triptych approach was originally employed by the EU to allocate its Kyoto target among member states.⁸² The reference to “triptych” reflects the focus of the original model on CO₂ emissions from three sectors: power generation; energy-intensive industries, such as cement and steel; and the domestic sector, encompassing the residential sector and transportation. The extended or global triptych takes the original a step further to cover the waste sector and agriculture, thus covering non-CO₂ gases, such as methane and the other industrial gases controlled under the Kyoto Protocol.

A bottom-up, technological analysis is employed to identify the emission reduction potential in these sectors. This analysis is coupled with projections of expected growth in the sector – for instance, are energy-intensive industries expected to maintain a their share of the economy – and population figures in order to derive national emission targets. For example, to calculate the emission allowance from the power sector for a country, assumptions are made about growth rates and per capita consumption, and requirements are imposed on how electricity may be generated, with minimum figures for renewable energy. The analysis takes account of the fact that countries’ generation mix varies enormously, as does the renewable energy potential and public acceptance of nuclear energy.

The proposal is attractive in that it appears to offer a fairly “objective” and technical solution to the differentiation conundrum, while at the same time respecting equity principles. The approach is sensitive to the individual circumstances of countries, as well as the principles of need and capability. Its main practical drawbacks are complexity and the reliance on production growth rates in industry and the power sector. As an essentially forward-looking approach, it is less responsive to historical responsibility, with possible result that developing countries with low emissions and relatively efficient industry could end up with a fairly stringent target. Given their very low level of industrial activity, and the difficulty in

⁸² BODANSKY, *supra* note 1, at 35; Helen Groenenberg et al, *Global Triptych: a bottom-up approach for the differentiation of commitments under the Climate Convention*, 4(2) CLIMATE POLICY 153 (2004).

projecting their growth path, it seems overly restrictive to set a target for least-developed countries (LDCs). The principles of need and responsibility – whether historical or current emissions – constitutes persuasive grounds on which to exempt LDCs. However, as its advocates acknowledge, the approach does imply value-laden choices with respect to the selection of long-term targets for the three sectors.⁸³ For instance, having energy efficiency decline too quickly to a low value, may prejudice countries whose heavy industry rests on a legacy of inexpensive electricity.

6.4 Conclusions

The overview of proposals for a future international response to climate change demonstrates that equity concerns figure prominently in a number of them. In addition, equity principles are also present in the policy evaluation criteria that are commonly put forward – for instance in the concern that a future agreement should be responsive to the poverty eradication and economic development objectives of developing countries, and that proposals should be capable of taking country-specific circumstances into account. That some of the approaches reviewed contain an explicit engagement with equity concerns is fitting and timely, because the climate regime as it stands has deferred the knottier, controversial topics. In the interests of broadening the participation the Framework Convention did not include emission targets; the Kyoto Protocol did set targets, for rather short time-frame, and only for industrialized countries, with much of the parties' energies devoted to fleshing out its provisions and bringing into operation the flexibility mechanisms. With steadily rising GHG concentration, the trade-offs, national interests and equity dimensions are ratcheted up. The longer the delay, the less time there is to begin taking the sensible, low-cost options in the near-term, while integrating the need to move to low-carbon future into public awareness, public policy and private investment decisions.

On the policy side, a successful future framework would ensure environmental effectiveness in line with a broadly defined and widely supported goal, and at the same time satisfy cost concerns. This would entail the engagement of developing countries in the joint effort to slow and then reduce global emissions. The distribution of the burdens and benefits associated with combating climate, more specifically the basis on which to share the burden of abatement, would not be resolved by recourse to equity and fairness principles. But equity principles are likely to form at least one part of the solution, while not denying that other factors – market forces, technical expertise, negotiating resources, political and economic influence – will play important roles.

Thus the conclusions drawn from this chapter are that proposals that seek actively to reflect both a balance of equity principles – responsibility, capability, need - and political and economic realities stand the best chance of being accepted and implemented by both developed and developing countries. It was noted that proposals that reflected a particular dimension of equity in a very “pure” form, for instance contraction and convergence, are partially taken up in more hybrid proposals such as the multi-stage convergence model. This is understandable. Equality is powerful notion, and in the long-run convergence of emissions pathways

⁸³ Helen Groenenberg & Jeroen van der Sluijs, *Valueloading And Uncertainty In A Sector-based Differentiation Scheme For Emission Allowances*, 71(1-2) CLIMATIC CHANGE 75 (2005)

is a geo-physical imperative. Overall, the transition to a low carbon future suggests a moderating of absolute claims and a search for bridging mechanisms. Differentiation will be critical but must be kept within the bounds of what can be managed within the context of multi-party negotiations. At the same time, because hard choices cannot be postponed, a tendency in international negotiations, a future climate regime cannot be everything to all parties – difficult choices have to be made. Visible efforts to reflect a variety of equity principles would contribute to a shared perception that a new agreement is “fair”.

The future approach should have universal participation, but be flexible enough to accommodate initiatives by a smaller group of countries. Fifteen countries are responsible for almost three-quarters of global emissions. It would be sensible for them to make a concerted effort to seek common ground. In going forward, openness to new proposals and ideas is critical. A simple and immediate extension of absolute targets to developing countries is neither politically feasible nor fair and equitable. A pledge-based system for developing countries, based on sustainable development policies and measures (SD-PAMs) proposal, may be one way to begin including the less economically advanced countries in the developing country category. The review mechanism could build on the existing expert reviews of Annex 1 communications, as well as models such as the Trade Policy Review of the World Trade Organization, a process designed to facilitate the smooth functioning of the multilateral trading system by enhancing the transparency of countries’ trade policies.⁸⁴ Differentiation among developing countries will be important – Haiti and Singapore can no longer be treated as falling into the same category for the purpose of international climate policy. However developing countries would need to be convinced that they are not trading group solidarity for nothing.

Finally, one of the greatest uncertainties in projecting climate change is the course of future economic growth. This uncertainty is greatest for developing countries, whose economies are not yet fully developed. Any assumption of fixed allocations is therefore riskier for developing than industrialized, whose growth rates do over time vary, but where the basic economic structure is in place and underlying trends (shift towards services) are ongoing and relatively slow. On the other hand, who can say exactly what the industrial profile and emissions of India will be in 15-20 years? This argues for flexibility for developing countries, at least in the initial stages, which can be achieved through a variety of mechanisms and policy instruments.

⁸⁴ See background on the website of the World Trade Organization:
http://www.wto.org/english/tratop_e/tpr_e/tp_int_e.htm.

Chapter 7 - Conclusion

This concluding chapter draws together different strands of the analysis presented in the thesis, highlighting the role of equity and fairness in the climate change regime. Applying insights from the analysis developed in the thesis, the conclusion proposes selected elements for a post-Kyoto climate policy. These proposals are consistent with the fairness and equity principles as articulated in the prior analysis, while also taking into account what appears to be feasible politically.

Equity and fairness in context

This thesis set out to analyze and demonstrate the relevance of fairness and equity in the international climate regime. The purpose of this analysis is identifying equity and fairness principles that ought to guide the allocation of responsibility to avoid dangerous climate change. While these principles alone are not decisive, an improved understanding of, and engagement with, fairness and equity is important as the nations of the world move towards the next, and most important phase, of the international climate negotiations. Analysis of the equity and fairness dimensions should enrich, contextualize and complement insights gained from economics, international relations and other modes of policy analysis. Climate change is an enormously complex, multidimensional problem that mixes together science, law, economics, technological advancement and, recently security interests, in a manner that few other global problems do.

Two quantitative disciplines - the natural sciences and economics - have to date played a key role in the discourse on climate change. The scientific study of climate change has spurred a massive international research effort that has pushed back the boundaries of knowledge about the behavior of, and influences on, the earth system. As outlined in chapter one, the Fourth Assessment Report of the IPCC concluded that observed warming is unequivocal and that human activities are the dominant cause. Accordingly the focus now shifts to improving the understanding of more precisely how these impacts can be mitigated, when, where and how severe the impacts of change will be, and how to deal with adaptation to the consequences of changes that fail to be mitigated. Yet as explored in chapter two, the interaction between science and public policy is far from the linear relationship of warning of a grave threat from an authoritative source, followed by an appropriate and timely response. The message is filtered by the media - sometimes amplified beyond the evidence, frequently undermined by the perceived need to air "opposing" viewpoints. Far from being subjected to cool consideration and prompting deliberate action, scientific findings are tossed into the fray of interest group politics at the domestic and international levels. In short, while it provides an authoritative description of the problem and outlines the parameters for a solution, a scientific consensus alone is insufficient to bring about changes in society. This thesis suggests that another key dimension of human society's response to climate change relates to equity and fairness.

However, while there is a consensus among scientists on the gravity of climate change, economists have remained more divided on the costs and benefits of

taking early action.¹ Some of the ethical problems associated with the application of cost-benefit analysis in the climate change context were outlined in chapter four. Overall, a failure to properly appreciate the limitations of such analyses may contribute to obscuring ethical and value choices. Ultimately our welfare is dependent on the natural system, which is only imperfectly incorporated into our decision-making frameworks. A conclusion from this thesis is that open articulation of principles such as equity and fairness can usefully complement currently dominant modes of policy analysis, particularly economic rationality.

Fairness and equity are part of the vocabulary we use to analyze and argue about everyday problems in human society. This is no less so merely because the concept of fairness cannot be defined as readily as, say gross domestic product. The contested nature of fairness is not sufficient grounds to disqualify it from consideration. It is suggested fairness and equity prove useful in understanding the climate change problem in the context of human society's response to climate change for at least two reasons. First, fairness and equity in fact feature prominently in public discourse concerning climate change and what to do about it. Second, climate change directly concerns the allocation of burdens and benefits – the adverse effects are unequally distributed and the key question in formulating the response is how to allocate the costs this entails. In this respect, in its latest report the IPCC estimates that the costs of combating climate change range from a small net gain to a 3 per cent loss in world domestic product - non-trivial, but certainly not prohibitive.² The crucial issue then is who bears the costs, namely the distribution of the burden. And, as we saw in chapter four, fairness is generally regarded as having two important forms – compensatory and distributive fairness. From this perspective, fairness “fits” the endeavor of analyzing responses to climate change in the context of human society.

Differing perceptions of fairness represent a real constraint on the possibilities for international climate policy.³ The thesis has detailed the deep divisions between industrialized and developing countries with respect to the responsibility for climate change. Arriving at a comprehensive and shared understanding of fairness is a difficult, if not impossible, undertaking. And it is not the task attempted in this thesis. In chapter four, it was found that no single account of equity or fairness could satisfy the demands placed on it by parties possessing competing conceptions of what is fair and just, and animated by divergent material interests. Rather, a more promising approach was to identify equity and fairness principles particularly applicable to the climate change problem, and in so doing arriving at a working consensus that supports, not hinders, the required collective action. In other words, such a working consensus might represent the area where

¹ See for a notable exception, NICHOLAS STERN, *THE ECONOMICS OF CLIMATE CHANGE, THE STERN REVIEW*, CABINET OFFICE, HM TREASURY (2006). One of the central conclusions of the Stern Review was that the costs of inaction outweighed the costs of action to combat climate change. Leading economists immediately criticized the Stern Review's approach, see William Nordhaus, *Critical assumptions in the Stern Review on Climate Change* 317 (5835) SCIENCE 201 (2007).

² IPCC, *CLIMATE CHANGE 2007: MITIGATION, CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE* 16 (Bert Metz et al eds., 2007).

³ Steve Rayner & Elizabeth M. Malone, *Ten suggestions for policymakers*, in 4 *HUMAN CHOICE AND CLIMATE CHANGE* 109, 116 (Steve Rayner & Elizabeth M. Malone, eds., 1999).

several, sometimes competing, fairness claims overlap. Accordingly, chapter four selected a representative sample of general fairness and equity principles: egalitarian; responsibility or contribution; need; and capability. These general principles of fairness and equity operate at a high level of generality, but associated with them are more specific burden-sharing rules, which incorporate concrete applications of one or more general principles. It is these that can be applied in a more concrete manner to assess various international climate change policy proposals, a task carried out in chapter six.

A range of principles forms an intrinsic part of international environmental law. Principles of equity and fairness are not only constituents of the discourse on climate change, but they are also embedded in the Framework Convention and its Kyoto Protocol. This is the conclusion arrived at in chapter five, which identifies and analyzes provisions of the Convention and the Protocol having a bearing on fairness and equity. In particular, the principle of common but differentiated responsibilities, a cornerstone of the climate regime gives effect to equity and fairness principles. Equity and fairness concerns are encapsulated in this principle, which was analyzed in some detail. The chapter also explores how the notion of differentiation relates to provisions concerning the transfer of cleaner technology and financial assistance. In short, equity and fairness concerns are woven into the fabric of the climate regime, which suggests that a deeper understanding and contextualized interpretation offers insights for the future of international climate policy.

Chapter six assessed a broadly representative sample of actual climate policy proposals against selected fairness principles and policy design criteria. The overview of proposals for a future international response to climate change demonstrates that equity concerns figure prominently in a number of them. The key conclusion is that proposals that reflect both a balance of equity principles – responsibility, capability, need – and political and economic realities, stand a better chance of garnering broad acceptance among both developed and developing countries. Overall, the transition to a low carbon future suggests a moderating of absolute claims and a search for solutions that takes into account differing circumstances. Visible efforts to reflect a variety of equity principles would contribute to a shared perception that a new agreement is based on a “working consensus” that melds fairness with a dose of political reality. The distribution of the burdens and benefits associated with combating climate change, more specifically the basis on which to share the burden of abatement, will certainly not be resolved by recourse to equity and fairness principles alone. But equity principles will constitute an important part of the solution, while not denying that other factors – market forces, technical expertise, negotiating resources, political and economic influence – will also play key roles.

We have seen that the international negotiations on climate change follow the same fault lines as issues of international development and global debates about the unequal relations between states. This presents risks and opportunities. On the one hand, superimposing debates on global development, which tend to roughly fracture along North-South lines, on the climate change negotiations risks miring them in interminable and possibly irresolvable disputes. On the other, it is an exercise in futility to try and ignore the elephant in the conference room, by insisting on a pure, technocratic climate policy. The development dimension is a reminder that tackling global climate change will require more than sophisticated, but top-down, policy instruments such as cap-and-trade schemes. What is needed is an approach that

addresses the economic, social and environmental dimensions of climate change. It is suggested that analyzing fairness and equity provides a “language” for better understanding these concerns and, it is hoped, framing creative solutions.

Cautionary notes on the road towards a post-2012 climate policy

Despite not inconsiderable attention at national and international levels, progress in combating climate change has been halting. Pushed on this point, many analysts and observers will put it down to a lack of “political will”, a somewhat mysterious substance associated with the tendency to turn words into action. While serious political commitment has indeed been lacking – compare the attention lavished on economic growth, security threats and other public policy matters – framing a global response to climate change is likely to remain a difficult and complex task. The following are some broad implications for policy-making.

- **Retain flexibility:** The climate change regime is in a transition phase, from half-hearted action by industrialized countries, to a new stage in which the challenge facing the international community is the creation of a truly shared response. As in other transitions, a rigid insistence on particular ethical or moral claims is likely to prove neither helpful nor appropriate – reciprocity and a moderation of absolute claims provide the appropriate touchstones. With respect to equity and fairness, this may entail seeking out principles with the broadest agreement among different groups, which suggests nuanced understanding of leading principles such as capability and responsibility.
- **Accept second-best:** Climate scientists model stabilization scenarios measured in increments of GHG concentrations, each one with its own “best estimate” of temperature increases. Economic models optimize the allocation of resources to maximize welfare. In their implementation, the policies flowing from these technical exercises will collide with society’s untidy reality, in other words with delays, interest group-trade-offs and unintended consequences. This suggests that decision-makers should strive for the most robust and effective policies, but without putting perfection before action. Naturally climate policies should be implemented in a deliberate manner, but inaction as opposed to the unintended consequences of precipitate action is now recognized as the greater risk.⁴
- **Realism about technology:** Technology is rightly identified as pivotal to addressing climate change. Fundamentally technological advancement matters, because many consider making significant inroads into the other main drivers of emissions – population growth and rising consumption – as neither desirable nor practicable. Certainly, denying the world’s poor access to the next rung of the development ladder on the grounds of climate protection would be inequitable and politically entirely unrealistic. Nonetheless, questions can be asked about the sustainability of the continuous quest for growth in the regions of the world that

⁴ NICHOLAS STERN, THE ECONOMICS OF CLIMATE CHANGE, THE STERN REVIEW, CABINET OFFICE, HM TREASURY 193 (2006). But cf. Jason F. Shogren & Michael A. Toman, *How Much Climate Change is too Much? An Economics Perspective*, in CLIMATE CHANGE ECONOMICS AND POLICY: AN RFF ANTHOLOGY, 35, 43 (Michael A. Toman, ed., 2001).

have long attained prosperity.⁵ What is the potential for technology in bringing us to the low-carbon economy? A standard assumption is that an appropriate mix of public and private funding, incentives in the form of a carbon market, or a combination of both will deliver the necessary clean technologies. Taking an optimistic view of the potential, reference can be made to the torrid pace of transformation in the telecommunications or computer industries, illustrative of the potential for innovation of new technologies. Perhaps more sobering is to look where it matters, at the energy industry. Essentially, the record of power generation in the 20th century is, with the exception of the gas turbine and nuclear fission, one of only incremental and process improvements to a basic technology – the steam boiler – that dates from the 19th century. This implies that unbridled optimism for the transformative effect of breakthrough energy technologies is probably misplaced.⁶ A new mitigation technology, carbon capture and storage, is essentially an end-of-pipe solution that may buy time; even its most fervent backers admit that it is not a “silver bullet”. Questions remain over whether it could be deployed in time to make significant difference, and it will require the development of new infrastructure to pipe CO₂ from power plants to storage sites. Renewable energy excluding hydro constitutes about three per cent of global energy demand and, with a transmission infrastructure designed for large fossil fuel plants, the large-scale integration of sources such as wind presents problems. Overall, a pragmatic climate and energy policy would focus on the steady improvement and rapid deployment of a menu of existing technologies – renewables, energy efficiency, cleaner fossil fuel technologies, and nuclear. More than questions relating to, safety, long-term storage of nuclear waste, and proliferation threats their high capital cost is likely to remain a brake on construction of new nuclear facilities.

- **The twin challenges of adaptation and mitigation:** From the time that climate change began to be of concern to scientists and policy-makers mitigation has received more attention than adaptation to the adverse impacts climate change. It is telling that although the Convention recognizes the importance of adaptation, and singles out particularly vulnerable groups of countries, the overall design of the Kyoto Protocol is almost entirely aimed at mitigation. Recognition of the need to address current and future vulnerabilities to climate impacts does not stand in opposition to strong mitigation action – it simply recognizes the fact that current GHG concentrations commit us to some climate change, not matter what. Failure to take adaptation needs seriously is also a failure to address fairness and equity, because it is quite clear that the poorest countries are also the ones that will bear the brunt of the impacts.⁷ The benefits of implementing

⁵ See LESTER R. BROWN, *PLAN B 3.0: MOBILIZING TO SAVE CIVILIZATION* (3rd ed. 2008) and JAMES GUSTAVE SPETH, *THE BRIDGE AT THE END OF THE WORLD: CAPITALISM, THE ENVIRONMENT, AND CROSSING FROM CRISIS TO SUSTAINABILITY* (2008).

⁶ VACLAV SMIL, *ENERGY AT THE CROSSROADS: GLOBAL PERSPECTIVES AND UNCERTAINTIES* 129-133 (2003). He catalogues some of the wildly optimistic scenarios that respected experts and institutions predicted for nuclear fission. *Cf.* MICHAEL SCHELLENBERGER & TED NORDHAUS, *BREAK THROUGH: FROM THE DEATH OF ENVIRONMENTALISM TO THE POLITICS OF POSSIBILITY* (2007).

⁷ See UNDP, *HUMAN DEVELOPMENT REPORT 2007/2008, FIGHTING CLIMATE CHANGE: HUMAN SOLIDARITY IN A DIVIDED WORLD* (2007).

adaptation measures are by definition local, not global, so that support for adaptation relies heavily on expressions of solidarity. In this respect the Adaptation Fund established under the Kyoto Protocol, which does not rely on voluntary contributions – essentially charity – is a welcome innovation, though it remains a proverbial drop in the bucket.

A post-2012 climate policy: “muddling through” to a sustainable future?

Drawing on the ideas developed in the thesis, this section outlines a number of ideas and recommendations relating to post-2012 international climate policy.

The central failing of climate regime is that the mitigation actions under the Convention and the Protocol fall well short of what is required. As described, influential parties were well aware that the Convention did not mandate adequate mitigation action, leading to the launch of negotiations culminating in the Kyoto Protocol. The compromise that paved the way for those negotiations – absence of targets for developing countries – was defensible, but left a vacuum, in which incentives for developing countries’ mitigation efforts were not integrated into the climate regime. It is possible that a pursuit of Kyoto’s targets, and the years-long process of rule-making to implement the agreement, distracted attention from practical and creative ways to begin addressing developing countries’ emissions, for instance by giving real meaning to the technology transfer provisions of the Convention. Since its adoption in 1997, the parties have devoted considerable energy to establishing and testing the Kyoto institutions, in the process creating a valuable, if somewhat cumbersome legacy. Thus this thesis does not subscribe to the view that Kyoto represents a failed effort.⁸ The point is rather that complementary policies that integrated development and climate concerns were not explored.

What then could be the contours of a future climate agreement? First, the allocation of responsibility to undertake mitigation action should be as consistent with a broad overlapping of equity and fairness principles – the working consensus – as possible. In this regard, the principles that have emerged from the analysis presented in this thesis are equality, responsibility, capability and need. Second, the agreement should aim for the greatest degree of coordination possible under the umbrella of the Convention, thus opting for an approach that reflects key elements of the multi-stage and graduation proposals. These are “top-down” approaches that typically apply indices reflecting rough indicators of responsibility (emissions per capita) and capability (GDP per capita) to determine where countries fall on the commitments spectrum: (a) the poorest of the developing countries receive international support but do not undertake binding emission limitation commitments; (b) emerging and middle income developing countries agree to carry out verifiable and reportable mitigation actions to limit emissions growth; and (c) industrialized commit to quantified emission reduction targets. Over time the measures the control measures are tightened as countries “graduate”. Aside from incorporating equity criteria, the multi-stage and graduation variety of proposals also

⁸ David Victor, *Fragmented carbon markets and reluctant nations: implications for the design of effective architectures*, in *ARCHITECTURES FOR AGREEMENT: ADDRESSING GLOBAL CLIMATE ON THE POST-KYOTO WORLD* 133 (Joseph E. Aldy & Robert N. Stavins, eds., 2007).

satisfy key policy design criteria, meaning that they should at least be good candidates for achieving results in the real world.

Animated by a different – more skeptical – view of the potential of international cooperation and treaty making are the “bottom-up” proposals, spanning a focus on technology agreements and a gradual linking of domestic cap-and-trade schemes. Advanced as the main thrust of an international climate policy, these proposals fail to satisfy the core equity and fairness principles and basic policy criteria, chiefly environmental effectiveness. Fundamentally they lack any meaningful engagement with dimensions of fairness, coordination and reciprocity of commitments and actions necessary for an effective global climate policy.

Within the multi-stage framework described above, a future agreement should encourage universal participation by accommodating different commitment types appropriate for countries with differing national circumstances and at varying stage of economic development. It should be noted that the multi-track approach would in practice provide the guiding principles, rather a rigid prescription. Flexibility would entail a range of commitment types, not limited to the targets and timetables of the Kyoto Protocol. A future climate policy will contain a wider menu of commitment options differentiated along a number of axes: binding or non-binding; economy-wide or covering only particular sectors; and degree of stringency. Yet the urgent need to control emissions from *all* major emitters means that flexibility cannot come at the expense of ambition. A number of things follow from this. First, the overall process and framework of the negotiations must set a clear negotiating mandate and be conducive to eliciting the maximum degree of commitment from all key parties. In this regard, it has been argued that an integrated, package approach allows parties to make tradeoffs and promotes reciprocity.⁹ This entails integrating the different issues – adaptation, technology transfer, financing – into one broad negotiating agenda. Second, there should be clarity on the types of commitments applicable to different countries.¹⁰

How does the negotiating mandate in the Bali Action Plan compare on these points? It clearly confirms the Convention process as the forum for the negotiations and sets a clear deadline, 2009, for their conclusion. Although the relationship between the two negotiating tracks under the Convention and Protocol, respectively, is not entirely clear, it is assumed that they will converge into a “package deal” in 2009. The Action plan makes a basic distinction between the commitments applicable to developed countries (“mitigation commitments or actions” and developing countries “nationally appropriate mitigation actions”).¹¹ However, the language is very broad and could easily span a range of commitment types. The mandate also refers to “cooperative sectoral approaches and sector-specific actions” in the context of development and transfer of mitigation technologies. The following mix of commitments could form part of a future climate agreement.

- Kyoto-style targets are appropriate for industrialized countries and should be tightened in the post-2012 period. The consistent contention advanced in this thesis is that binding, Kyoto-style targets were, and remain, inapplicable

⁹ DANIEL BODANSKY & ELLIOT DIRINGER, TOWARDS AN INTEGRATED MULTI-TRACK CLIMATE FRAMEWORK 23 (2007).

¹⁰ *See id.*

¹¹ Bali Action Plan, para. 1(b).

to developing countries, on both equity and practical grounds.¹² On equity grounds it seems unconscionable – not to mention politically unrealistic – to expect that China, a country where some 300 million citizens still live in poverty, should assume the type of binding measures that major developing countries have avoided. Article 3(1) of the Convention provides that “the developed country Parties should take the lead in combating climate change”. From a practical perspective, in the emerging economies, the course of economic growth and pace of technological transformation is simply too unpredictable for the successful implementation of absolute emission caps. Instead, the key policy goal would be to begin slowing the rate of emissions growth and move decisively away from the business-as-usual emissions scenario. This would be achieved through a concerted effort to improve energy efficiency in all sectors, and supporting the deployment of the least emissions-intensive equipment in sectors with long-lived infrastructure, especially the power sector. As indicated at the Bali Climate Change Conference, such mitigation action by developing countries would need to be verifiable and reportable, which in turn would trigger financial and technical support.

- There is interest in and support for sectoral policies, which could either focus on technology cooperation and transfer in certain emissions-intensive industries or be expanded to include a means of crediting improvements over and above a voluntary but benchmarked baseline (so-called “no-lose” policies). This could be designed in a way to reward national mitigation actions, such as the Chinese climate change program that aims at an overall economy-wide efficiency improvement, as well setting targets in a number of key sectors.
- An option that also been raised in the negotiations is a pledge-based system for developing countries, based on sustainable development policies and measures (SD-PAMs). These are policies and measures aimed at meeting the domestic objectives of a developing country, but that also bring significant benefits to the climate through reduced GHG emissions, an example being the Brazilian biofuels program, which was adopted on energy security and economic development grounds.

As detailed in chapter 5, the technology transfer and financing aspects of the climate regime have remained underdeveloped and inadequate. Article 7(4) of the Convention explicitly recognizes that “the extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology”. Accordingly the post-2012 climate policy will need to effectively address the issues of technology and financial resources to support mitigation and adaptation actions in developing countries. This issue has remained unresolved since the inception of the climate regime. Political realities set limits on the potential for

¹² For a usefully detailed account of why binding targets are not practicable, see ROB BRADLEY & HILARY MCMAHON, *THE ROLE OF POLICIES AND MEASURES FOR CLIMATE MITIGATION IN CHINA* (World Resources Institute, BASIC Project, Working Paper no. 4, 2007).

direct North-South resource transfer, witness the difficulty all but a handful of industrialized countries have had in meeting the long-standing development aid target of 0.7 per cent of gross national product (GNP). In contrast, global carbon trading is attractive because although its effect is very similar to a tax – firms pass on the carbon price to other firms and consumers – it obscures the resource flows. Having firms in carbon intensive industries purchase credits from emission-reducing projects in China has the dual advantages of being cheaper than undertaking the same reductions domestically and potentially politically more palatable than providing outright aid for clean technology. This points to the need to scale up and expand the clean development mechanism (CDM), which has shown considerable growth.

In expanding the CDM, the parties will need to consider how to remedy some of its shortcomings and problems, which stem from the fact that it is project-based. First, offsetting projects such as the CDM are inherently subject to baseline manipulation, requiring strict verification protocols if environmental integrity is to be assured.¹³ Project developers naturally regard such rules as unnecessary red tape, and there is some evidence that they have been able to manipulate the rules.¹⁴ Second, because the CDM is project-based, it lacks scale – making energy efficiency improvements at one plant, as opposed to providing credits for a program or policy that tackles promotes improvements in a whole sector. Expanding the CDM to encompass programmatic or policy-level action raises verification and methodological issues. One option could be to create a two-tier CDM, with a project-style track, and second, programmatic and policy track, with its own rules and procedures. Certainly, while not without problems, the CDM has spurred a vibrant market and unlocked emissions reduction potential, especially in major developing countries. As is the case now with the EU Emission Trading Scheme, major industrialized countries will probably allow the “import” of credits from any successor to the CDM.¹⁵

Carbon trading under the CDM or a successor will not be sufficient to stimulate the transfer of low-carbon technology from industrialized to developing countries at the scale required over the next few decades. The same is true of the Global Environment Facility, which is mandated to carry out technology transfer under the Convention. A recent study prepared for the Secretariat of the Convention concluded that estimated global additional investment flows of \$200-210 billion would be necessary in 2030 to return global emissions to current levels.¹⁶ In order to promote the rapid deployment of low-carbon technology in developing countries, mechanisms are required to finance the incremental costs of cleaner technology. It is

¹³ See Chapter 5.

¹⁴ AXEL MICHAELOW & PALLAV PUROHIT, CLIMATE STRATEGIES, ADDITIONALITY DETERMINATION OF INDIAN CDM PROJECTS: CAN INDIAN CDM DEVELOPERS OUTWIT THE CDM EXECUTIVE BOARD? (2007), <http://www.climate-strategies.org/uploads/additionality-cdm-india-cs-version9-07.pdf>.

¹⁵ See e.g. S.2191, 110th Cong. Subtitle H – International Forest Protection. America’s Climate Security Act of 2007 (Lieberman-Warner Bill) provides that up to 3 per cent of annual allowances could be sourced from international forestry projects.

¹⁶ UNFCCC, DIALOGUE WORKING PAPER 8 (2007), REPORT ON ANALYSIS OF EXISTING AND POTENTIAL INVESTMENT AND FINANCIAL FLOWS RELEVANT TO THE DEVELOPMENT OF AN EFFECTIVE AND APPROPRIATE INTERNATIONAL RESPONSE TO CLIMATE CHANGE 2 (2007).

suggested that several of the existing mechanisms could be re-configured and given expanded mandates in relation to financing and the transfer of low-carbon technologies. The central pillar of this approach would be the establishment of a mechanism to promote the deployment of clean technology, drawing on the model of Multilateral Fund under the Montreal Protocol, which would function broadly under the auspices and guidance of the Convention. Linking the mechanism to the Convention contributes to broader buy-in, so that different countries are comfortable participating, and alignment with the priorities emerging from the intergovernmental process. The mechanism should: (a) ameliorate donor suspicion associated with aid, namely the risk of being diverted from intended uses; (b) the transaction costs and complexities associated with CDM projects; and (c) address the issue of scale inherent in the GEF and other existing climate change funds. The mechanism could be structured so has to have several “windows” serving different financing and technology needs.

Technology cooperation and public-private partnerships are another area that could be fostered and facilitated under a new international climate policy. The involvement of the private sector, as the owner and primary developer of technology, is particularly important. While the private sector can be expected to be most sensitive to market signals – not pious wishes expressed at intergovernmental meetings – there is certainly room for greater public-private cooperation to advance R&D priorities and pave the way for deployment of new technologies. The Asia-Pacific Partnership on Clean Development and Climate (APP), genuinely positioned as a complement to the Convention process, could play a role in fostering international public-private technology cooperation.

While greater international action on technology and financing is essential, national actions and priorities will remain important, but it is hoped with the priorities identified under the Convention having a halo effect. The export credit agencies (ECAs) of the industrialized countries could play a much greater role in aggressively facilitating the sale of clean technologies.¹⁷

For now, the forum for future negotiations seems assured. Recent events have affirmed the desire of countries to conduct the multilateral climate negotiations under the Framework Convention, which with almost universal participation, is imbued with a unique legitimacy. Although legitimacy is an intangible it has real, if fluid, currency in international climate policy. Fifteen countries are responsible for almost three-quarters of global emissions. It would be sensible for them to make a concerted effort to seek common ground, either wholly within the Convention process, or aided by coordination in forums outside the multilateral negotiations. Going forward, greater differentiation among developing countries will be important – Haiti and Singapore can no longer be treated as falling into the same category for the purpose of international climate policy. However, developing countries would need to be convinced that they are trading group solidarity will not come at the expense of fairness. Although individual negotiators may be of the highest caliber, many developing countries are overmatched in terms of negotiating resources,

¹⁷ See EXPORT-IMPORT BANK OF THE UNITED STATES, ANNUAL REPORT 2007 15 (2007). The estimated export value of these transactions related to power generation and transmission, oil and gas exploration and refineries in 2007 was US\$ 1.1 billion. The same year saw US\$ 2.6 million in export-credit insurance transactions supporting U.S. renewable-energy exports.

seldom having at their disposal the same depth of technical resources possessed by industrialized countries. There is a risk that, unable to adequately evaluate the full import of complex and increasingly differentiated proposals, smaller groups of developing countries may balk. In this regard, the open flow of information and analysis from think tanks and NGOs, some of which have developed a reputation for impartial analysis, is of great value. Fairness of the process, in addition to fairness of outcomes, will also assume greater importance.

At the Bali conference in December 2007, the international community committed itself to negotiations on a post-2012 climate agreement, with agreement to be reached at the 15th Conference of the Parties in Copenhagen in 2009. Reaching agreement on a framework conducive to strengthening mitigation and adaptation action in developing countries, especially the emerging economies, will be of critical importance. Similarly, a way will need to be found to re-integrate the United States into the mainstream of international climate policy. In this regard, it is salutary to bear in mind that that binding targets are not somehow antithetical to the United States - after all, it was the United States that proposed binding targets in the negotiations leading to the Kyoto Protocol. Given commitment and political will, positions regarding policy instruments can quickly change. The road from Bali to Copenhagen and beyond will surely have its share of few twists and turns, but the need to arrive at a fair and effective agreement is now more urgent than ever before.

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